# Owner's Manual & Safety Instructions

Save This Manual Keep this manual for the safety warnings and precautions, assembly, operating, inspection, maintenance and cleaning procedures. Write the product's serial number in the back of the manual near the assembly diagram (or month and year of purchase if product has no number). Keep this manual and the receipt in a safe and dry place for future reference.

**REV 15i**

# CEN-TECH® ITEM 60794

# PROFESSIONAL
# OBD II & CAN
# SCAN TOOL



**Visit our website at: http://www.harborfreight.com**
**Email our technical support at: productsupport@harborfreight.com**

When unpacking, make sure that the product is intact and undamaged. If any parts are missing or broken, please call 1-888-866-5797 as soon as possible.

## ⚠WARNING

**Read this material before using this product. Failure to do so can result in serious injury. SAVE THIS MANUAL.**

# Table of Contents

CEN-TECH®

# 1. Safety Precautions And Warnings

**To prevent personal injury or damage to vehicles and/ or the Scan Tool, read this instruction manual first and observe the following safety precautions, at a minimum, whenever working on a vehicle:**

1. Always perform automotive testing in a safe environment.

2. Wear safety eye protection that meets ANSI standards.

3. Keep clothing, hair, hands, tools, test equipment, etc. away from all moving or hot engine parts.

4. Operate the vehicle in a well-ventilated work area: Exhaust gases are poisonous.

5. Put blocks in front of the drive wheels and never leave the vehicle unattended while running tests.

6. Use extreme caution when working around the ignition coil, distributor cap, ignition wires and spark plugs. These components create hazardous voltages when the engine is running.

7. Put the transmission in PARK (for automatic transmission) or NEUTRAL (for manual transmission) and make sure the parking brake is engaged.

8. Keep a fire extinguisher suitable for gasoline/ chemical/electrical fires nearby.

9. Don't connect or disconnect any test equipment while the ignition is on or the engine is running.

10. Keep the Scan Tool dry, clean, free from oil, water or grease. Use a mild detergent on a clean cloth to clean the outside of the Scan Tool, when necessary.

# 2. General Information

## 2.1 On-Board Diagnostics (OBD) II

The first generation of On-Board Diagnostics (called OBD I) was developed by the California Air Resources Board (ARB) and implemented in 1988 to monitor some of the emission control components on vehicles. As technology evolved and the desire to improve the On-Board Diagnostic system increased, a new generation of On-Board Diagnostic system was developed. This second generation of On-Board Diagnostic regulations is called OBD II.

The OBD II system is designed to monitor emission control systems and key engine components by performing either continuous or periodic tests of specific components and vehicle conditions. When a problem is detected, the OBD II system turns on a warning lamp (MIL) on the vehicle instrument panel to alert the driver typically by the phrase of "Check Engine" or "Service Engine Soon".
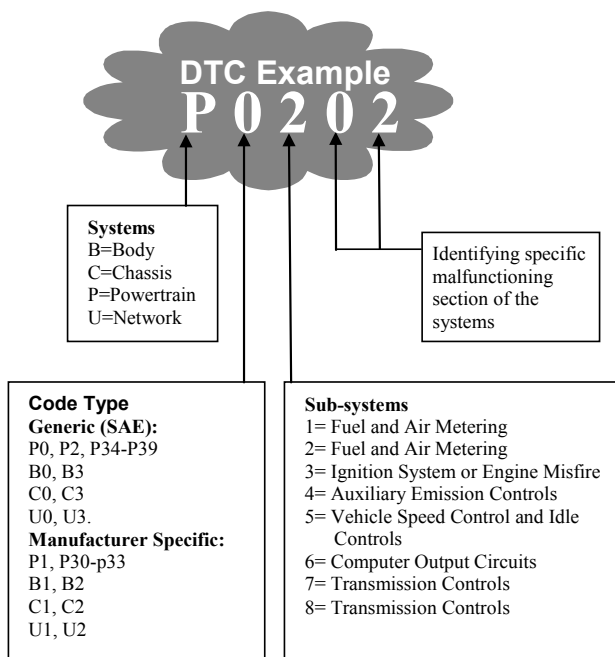
The system will also store important information about the detected malfunction so that a technician can accurately find and fix the problem. Here are three examples:

1. **Whether the Malfunction Indicator Light (MIL) is commanded 'on' or 'off'**

2. **Which, if any, DTCs are stored**

3. **Readiness Monitor status**

## 2.2 Diagnostic Trouble Codes (DTCs)

OBD II DTCs are codes that are stored by the vehicles' On-Board Diagnostic system in response to a problem found in the vehicle. These codes identify a particular problem area and are intended to provide you with a guide as to where a fault might be occurring within a vehicle.

OBD II DTCs consists of a five-digit alphanumeric code. The first character, a letter, identifies which control system sets the code. The other four characters, all numbers, provide additional information on where the DTC originated and the operating conditions that caused it to set. Here below is an example to illustrate the structure of the digits:

**DTC Example**
**P 0 2 0 2**

**Systems**
B=Body
C=Chassis
P=Powertrain
U=Network

Identifying specific malfunctioning section of the systems

**Code Type**
**Generic (SAE):**
P0, P2, P34-P39
B0, B3
C0, C3
U0, U3.
**Manufacturer Specific:**
P1, P30-p33
B1, B2
C1, C2
U1, U2

**Sub-systems**
1= Fuel and Air Metering
2= Fuel and Air Metering
3= Ignition System or Engine Misfire
4= Auxiliary Emission Controls
5= Vehicle Speed Control and Idle Controls
6= Computer Output Circuits
7= Transmission Controls
8= Transmission Controls

## 2.3 Location of the Data Link Connector (DLC)

The DLC is the standardized 16-cavity connector where diagnostic Scan Tools interface with the vehicle's on-board computer. The DLC is usually located 12 inches from the center of the instrument panel (dash), under or around the driver's side for most vehicles. If the DLC is not located under dashboard, a label should be there indicating its location. For some Asian and European vehicles, the DLC is located behind the ashtray and the ashtray must be removed to access the connector. If the DLC cannot be found, refer to the vehicle's Owner's Manual for the location.
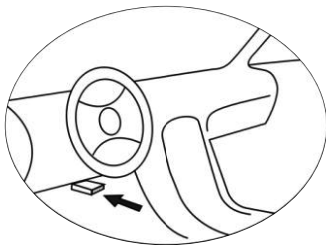


## 2.4 OBD II Readiness Monitors

An important part of a vehicle's OBD II system are the Readiness Monitors, which are indicators used to find out if all of the emissions components have been evaluated by the OBD II system. They are running periodic tests on specific systems and components to ensure that they are performing within allowable limits.

Currently, there are eleven OBD II Readiness Monitors (or I/M Monitors) defined by the U.S. Environmental Protection Agency (EPA). Not all monitors are supported by all vehicles and the exact number of monitors in any vehicle depends on the motor vehicle manufacturer's emissions control strategy.

# Continuous Monitors

Some of the vehicle components or systems are continuously tested by the vehicle's OBD II system, while others are tested only under specific vehicle operating conditions. The continuously monitored components listed below are always ready:

1. **Misfire**
2. **Fuel System**
3. **Comprehensive Components (CCM)**

Once the vehicle is running, the OBD II system is continuously checking the above components, monitoring key engine sensors, watching for engine misfire, and monitoring fuel demands.

# Non-Continuous Monitors

Unlike the continuous monitors, many emissions and engine system components require the vehicle to be operated under specific conditions before the monitor is ready.

# 2.5 OBD II Monitor Readiness Status

OBD II systems must indicate whether or not the vehicle's PCM monitor system has completed testing on each component. Components that have been tested will be reported as "Ready", or "Complete", meaning they have been tested by the OBD II system.

The purpose of recording readiness status is to allow technicians to determine if the vehicle's OBD II system has tested all the components and/or systems.

The Power-Train Control Module (PCM) sets a monitor to "Ready" or "Complete" after an appropriate drive cycle has been performed. The drive cycle that enables a monitor and sets readiness codes to "Ready" varies for each individual monitor. Once a monitor is set as "Ready" or "Complete", it will remain in this state. A number of factors, including erasing of DTCs with a Scan Tool or a disconnected battery, can result in Readiness Monitors being set to "Not Ready".

Since the three continuous monitors are constantly evaluating, they will be reported as "Ready" all of the time. If testing of a particular supported non-continuous monitor has not been completed, the monitor status will be reported as "Not Complete" or "Not Ready." In order for the OBD II monitor system to become ready, the vehicle should be driven under a variety of normal operating conditions. These operating conditions may include a mix of highway driving and stop and go, city type driving, and at least one overnight-off period. For specific information on getting your vehicle's OBD II monitor system ready, please consult your vehicle's Owner's Manual.

## 2.6 OBD II Definitions

**Power-Train Control Module (PCM)** -- The vehicle's on-board computer that controls engine and drive train.

**Malfunction Indicator Light (MIL)** -- Malfunction Indicator Light (Service Engine Soon, Check Engine) is a term used for the light on the instrument panel. It is to alert the driver and/or the repair technician that there is a problem with one or more of vehicle's systems and may cause emissions to exceed federal standards.

If the MIL illuminates with a steady light, it indicates that a problem has been detected and the vehicle should be serviced as soon as possible. Under certain conditions, the MIL will blink or flash. This indicates a severe problem and flashing is intended to discourage vehicle operation.

The vehicle's On-Board Diagnostic system cannot turn the MIL off until necessary repairs are completed or the condition no longer exists.

**DTC** -- Diagnostic Trouble Code that identifies which section of the emission control system has malfunctioned.

**OBD II Drive Cycle** -- A specific mode of vehicle operation that provides conditions required to set all the Readiness Monitors applicable to the vehicle to the "Ready" condition. The purpose of completing an OBD II drive cycle is to force the vehicle to run its on-board diagnostics. Some form of a drive cycle needs to be performed after DTCs have been erased from the PCM's memory or after the battery has been disconnected. Running through a vehicle's complete drive cycle will "set" the Readiness Monitors so that future faults can be detected. Drive cycles vary depending on the vehicle and the monitor that needs to be reset. For vehicle specific drive cycle, consult the vehicle's Owner's Manual.

**Freeze Frame Data** -- When an emissions related fault occurs, the OBD II system not only sets a code but also records a snapshot of the vehicle operating parameters to help in identifying the problem. This set of values is referred to as Freeze Frame Data and may include important engine parameters such as engine RPM, vehicle speed, air flow, engine load, fuel pressure, fuel trim value, engine coolant temperature, ignition timing advance, or closed loop status.

**Parameter ID (PID)** --  Codes that relay information about the systems monitored by your vehicle's emissions system, from fuel system status to engine and vehicle speed to the status of the vehicle's various O2 sensors. If there is an error with any of these parameters or if a value falls outside of a predetermined safe range, the vehicle will illuminate its MIL.

# 3. Using the Scan Tool

## 3.1 Tool Description



1.  **LCD Display** – Displays menus and test results.

2.  [ENTER] **ENTER BUTTON** – Confirms a selection
    (or action) from a menu. Starts recording live
    data under Manual Trigger mode.

3.  **ESC BUTTON** – Cancels a selection (or action) from a menu or returns to the previous menu.

4.  **LEFT SCROLL BUTTON** – When looking up DTC definitions, moves to previous screens if DTC definition covers more than one screen; deselects all marked PID data when viewing or recording customized live data list; moves to previous frames of data when playing back live data. Updates DTC library.

5.  **RIGHT SCROLL BUTTON** – When looking up DTC definitions, moves to next screens if DTC definition covers more than one screen; selects/deselects PID data when viewing or recording customized live data list; moves to next frames of data when playing back live data.

6.  **UP SCROLL BUTTON** – Moves up through menu and submenu items in menu mode. When more than one screen of data is retrieved, moves up through the current screen to the previous screens for additional data.

7.  **DOWN SCROLL BUTTON** – Moves down through menu and submenu items in menu mode. When more than one screen of data is retrieved, moves down through the current screen to next screens for additional data. It is also used for language setup.

8.  **HELP BUTTON** – Provides Help and Code Breaker information.

9.  **POWER SWITCH** – Turns the Scan Tool on/ off when powered by 9V battery; resets the Scan Tool when powered by vehicle battery.

10. **OBD II CONNECTOR** – Connects the Scan Tool to the vehicle's DLC.

11. **USB CONNECTOR** – Connects the Scan Tool to a computer for printing and upgrading.

## 3.2 Specifications

Display: Backlit, 128 x 64 pixel display with contrast adjustment

Operating Temperature: 0 to 60°C (32 to 140°F)

Storage Temperature: -20 to 70°C (-4 to 158°F)

External Power: 8.0 to 18.0 V power provided via vehicle battery

Internal Power: 9V battery

## 3.3 Accessories Included

1.  **OBD II Cable** – Provides power to tool and communicates between tool and vehicle.

2.  **USB Cable** – Used to upgrade the Scan Tool, and to print retrieved data.

3.  **9V Battery** – Supplies power to the Scan Tool when disconnected from vehicle DLC.

4.  **User's Manual** – Instructions on tool operations.

5.  **CD** – Includes user's manual, update software, etc.

## 3.4 Navigation Characters

1.  ► – Indicates current selection.

2.  ↓ – Indicates additional information is available on next screen(s).

3.  ↑ – Indicates additional information is available on previous screen(s).

4.  **$** – Identifies the control module number from which data is retrieved.

5.  **?** – Indicates Help or Code Breaker information is available.

6.  **G** – Indicates graphic viewing is available.

7.  ▯ – Indicates battery level.

## 3.5 Keyboard

No solvents such as alcohol are allowed to clean the Keyboard or Display. Use a mild nonabrasive detergent and a soft cotton cloth. Do not soak the Keyboard as the Keyboard is not waterproof.

## 3.6 Power

### Internal Power

The Scan Tool has a 9V battery that provides power for off-car reviewing and analysis. Press the power key to turn on the Scan Tool.

**Note:** If the Scan Tool is stored for a long period of time, remove the battery to prevent damage to the Scan Tool.

### External Power

The Scan Tool is powered via the vehicle's DLC. Just follow the steps below to turn on the Scan Tool:

1.    Connect the OBD II Cable to Scan Tool.

2.    Find the DLC on vehicle.

3.    Plug OBD II cable to the vehicle's DLC.

## 3.7 DTC Lookup

The **DTC Lookup** function is used to search for definitions of DTCs stored in the DTC library and for Code Breaker information.

1.  From **Main Menu**, use the **Up/Down** scroll button to select **DTC Lookup** then press the **ENTER** button.

```
┌─────────────────────────────┐
│        Main Menu            │
│=====================2/6     │
│ Diagnostics                 │
│ DTC Lookup                  │
│ Review Data          ?      │
│ Print Data                  │
│ System Setup                │
│ Tool Information            │
└─────────────────────────────┘
```
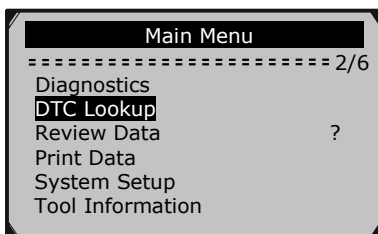
**Figure 3.1**

• The numbers x/y in the upper right corner = where x indicates the sequence of highlighted item and y indicates total number of items under the menu.

• Press the **?** button to view Help information of selected item.

2.  From **DTC Lookup** menu, use the **Left/Right** button to move to the desired character, use the **Up/Down** button to change selected digit/character, then press the **ENTER** button to confirm.

```
┌─────────────────────────────┐
│        DTC Lookup           │
│=========================    │
│         P 0 0 0 1           │
│ [←] – Left  [→] - Right     │
│ [↑]  [↓] - Change Digit     │
│ [ENTER] - Confirm           │
│ [ESC] - Exit                │
└─────────────────────────────┘
```
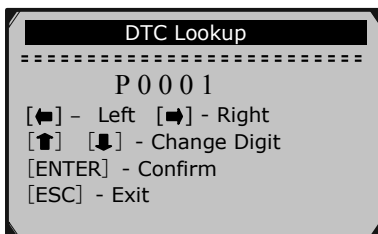
**Figure 3.2**

3. View the DTC definition on screen. When the DTC definition covers more than one screen, use the **Left/Right** button to view additional information on previous/next screens.

   • For manufacturer specific codes, you need to select a vehicle make on an additional screen to look for DTC definitions.

   • If definition could not be found (SAE or Manufacturer Specific), the Scan Tool displays "**DTC definition not found! Please refer to vehicle's User's Manual!**"

   • For Code Breaker information, press the **?** button.

4. To view previous or next DTC in the built- in DTC library, use the **Up/Down** button.

5. To enter another DTC, press the **ESC** button to return to previous screen.

6. To exit to **Main Menu**, press the **ESC** button.

## 3.8 System Setup

The Scan Tool allows you to make the following adjustments and settings:

1. **Language:** Selects the desired language.

2. **Contrast:** Adjusts the contrast of the LCD display

3. **Unit of Measure:** Sets the unit of measure to English or Metric.

4. **Auto Power-Off**: Sets automatic power-off limits.

5. **Beep Set:** Turns on/off beep.

6. **Tool Self-test:** Checks if the LCD display and Keyboard are working normally.

7. **Tool Information:** Allows viewing of some important information such as serial number and software version number of the Scan Tool.

8. **Update Mode:** Used for updating the Scan Tool.

   *• Settings of the unit will remain until change to the existing settings are made.*

## To Enter the System Setup Menu

From the **Main Menu,** use the **Up/Down** scroll button to select **System Setup**, then press the **ENTER** button.

```
┌─────────────────────────────┐
│        Main Menu            │
│ ===================== 5/6   │
│  Diagnostics                │
│  DTC Lookup                 │
│  Review Data           ?    │
│  Print Data                 │
│  System Setup               │
│  Tool Information           │
└─────────────────────────────┘
```
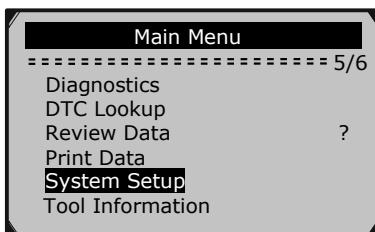
**Figure 3.3**

## Language

   *•English is the default language.*

1. From **System Setup** menu, use the **Up/Down** scroll button to select **Language**, then press the **ENTER** button.

```
┌─────────────────────────────┐
│       System Setup          │
│ ===================== 1/6   │
│  Language                   │
│  Contrast                   │
│  Unit of Measure       ?    │
│  Auto Power-off             │
│  Beep Set                   │
│  Tool Self-test             │
└─────────────────────────────┘
```

**Figure 3.4**

2. Use the **Up/Down** scroll button to select the desired language, then press the **ENTER** button to save your selection and return to previous screen.

```
┌─────────────────────────────────┐
│        Language                 │
│====================1/3          │
│ English                         │
│ Français                        │
│ Español                         │
│                                 │
│                                 │
└─────────────────────────────────┘
```

**Figure 3.5**

## Contrast

1. From **System Setup** menu, use the **Up/Down** scroll button to select **Contrast**, then press the **ENTER** button.

```
┌─────────────────────────────────┐
│       System Setup              │
│====================: 2/6        │
│  Language                       │
│  Contrast                       │
│  Unit of Measure        ?       │
│  Auto Power-Off                 │
│  Beep Set                       │
│  Tool Self-test                 │
└─────────────────────────────────┘
```
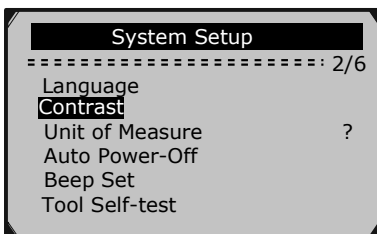
**Figure 3.6**

2. From **Contrast** menu, use the **Up/Down** scroll button to increase or decrease contrast, then press the **ENTER** button to save your settings and return to the previous menu.

```
┌─────────────────────────────┐
│         Contrast            │
│ ===========================  │
│                             │
│          (30%)              │
│                             │
│  ████████████               │
│                             │
│ Use ⬆ or ⬇ to change        │
└─────────────────────────────┘
```
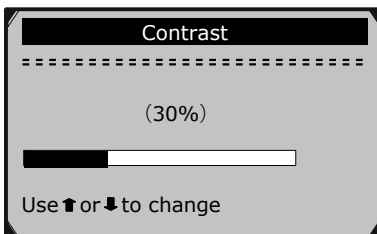
**Figure 3.7**

## Unit of Measure

> • *Metric is the default measurement unit.*

1. From **System Setup** menu, use the **Up/Down** scroll button to select **Unit of Measure,** then press the **ENTER** button.

```
┌─────────────────────────────┐
│        System Setup         │
│ ====================== 3/6   │
│   Language                  │
│   Contrast                  │
│   Unit of Measure        ?   │
│   Auto Power-off            │
│   Beep Set                  │
│   Tool Self-test            │
└─────────────────────────────┘
```
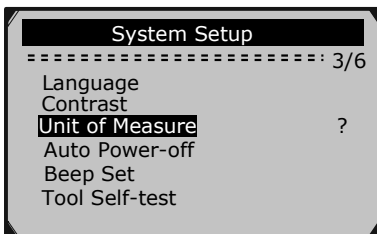
**Figure 3.8**

2. From **Unit of Measure** menu, use the **Up/ Dow**n scroll button to select the desired unit of measurement, then press the **ENTER** button to save your settings and return to the previous menu..

```
                  Unit of Measure
=======================:2/2
     English
     Metric                      ?
```
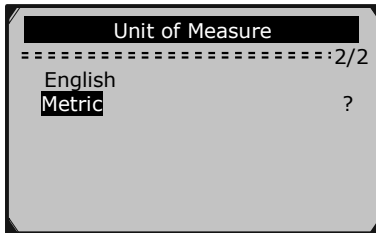
**Figure 3.9**

## Auto Power-Off

> • *The minimum Auto Power-Off time is 1
> minute, and the maximum is 20 minutes.*
>
> • *The Auto Power-Off function is available only
> when the Scan Tool is powered by 9V battery.*

1.    From **System Setup** menu, use the **Up/Down** scroll button
      to select **Auto Power-Off** then press the **ENTER** button.

```
                  System Setup
=====================: 4/6
     Language
     Contrast
     Unit of Measure             ?
     Auto Power-off
     Beep Set
     Tool Self-test
```

**Figure 3.10**

2.  From **Auto Power-Off** menu, use the **Up/Down** scroll button to increase or decrease time, then press the **ENTER** button to save your settings and return to the previous menu.

```
┌─────────────────────────────┐
│        Auto Power-off       │
│ ======================== │
│                             │
│     01 Minute               │
│     [↑] – Increase time     │
│     [↓] – Decrease time     │
│     [ENTER] - Confirm       │
└─────────────────────────────┘
```
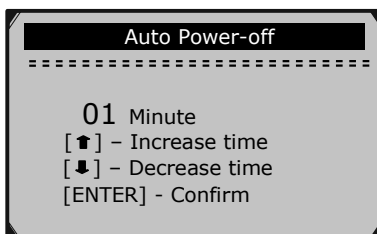
**Figure 3.11**

## Beep Set

• *The default setting is Beep On.*

1.  From **System Setup** menu, use the **Up/Down** scroll button to select **Beep Set** then press the **ENTER** button.

```
┌─────────────────────────────┐
│        System Setup         │
│ ===================== 5/6 │
│   Language                  │
│   Contrast                  │
│   Unit of Measure      ?    │
│   Auto Power-off            │
│   Beep Set                  │
│   Tool Self-test            │
└─────────────────────────────┘
```
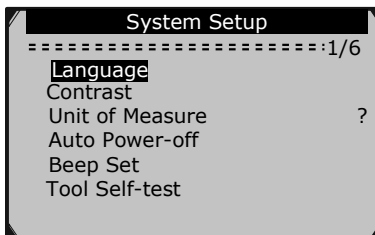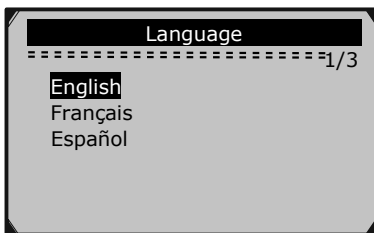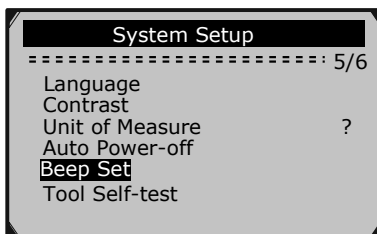
**Figure 3.12**

2.  From **Beep Set** menu, use the **Up/Down** scroll button to select **Beep ON** or **Beep OFF,** then press the **ENTER** button to save your settings and return to the previous menu.

```
                    Beep Set
= = = = = = = = = = = = = = = = = = = = = 2/2
  Beep ON
  Beep OFF                              ?
```
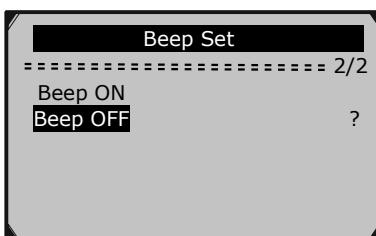
**Figure 3.13**

## Tool Self-test

## A. Display test

The **Display Test** function checks if the
LCD display is working normally.

1.   From **System Setup** menu, use the **Up/Down** scroll button
     to select **Tool Self-test**, then press the **ENTER** button.

```
                 System Setup
= = = = = = = = = = = = = = = = = = = = = : 6/6
  Language
  Contrast
  Unit of Measure                       ?
  Auto Power-off
  Beep Set
  Tool Self-test
```
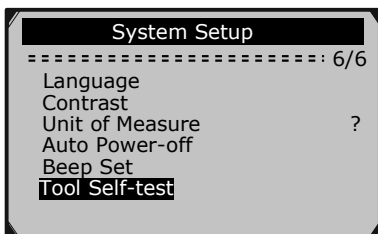
**Figure 3.14**

2. Select **Display Test** from **Tool Self-test** menu then press the **ENTER** button.



```
          Tool Self-test
= = = = = = = = = = = = = = = = = = = = = = = 1/2
Display Test
 Keyboard Test                    ?
```
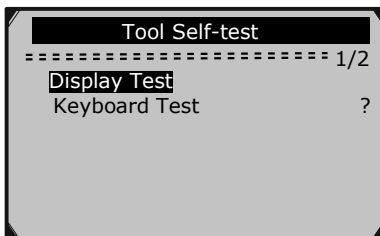
**Figure 3.15**

3. Press the **ENTER** button again to start test. Look for missing spots in the solid black characters.

4. When completed, press the **ESC** button to return to the previous screen.

## B. Keyboard Test

The **Keyboard Test** function verifies that the keys are functioning properly.

1. Use the **Up/Down** scroll button to select **Keyboard Test** from the **Tool Self-test** menu, then press the **ENTER** button.



```
          Tool Self-test
= = = = = = = = = = = = = = = = = = = = = = = 2/2
 Display Test
Keyboard Test                     ?
```
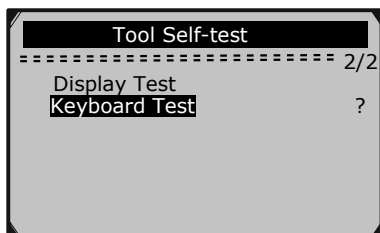
**Figure 3.16**

2.   Press any key to start test. When you press a key, the key name should be observed on the display. If the key name does not show up, then the key is not functioning properly.

```
┌─────────────────────────────────┐
│ ████████ Keyboard Test ████████ │
│ = = = = = = = = = = = = = = = = = = = = = = = = = = │
│           Press any key to        │
│              start test            │
│                                    │
│               key:                 │
│                                    │
│       Double [ESC] to return       │
│                                    │
└─────────────────────────────────┘
```
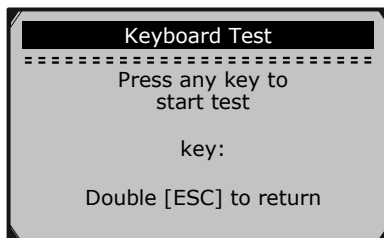
**Figure 3.17**

When you press the **Power** button, the key name will not show on the screen. Instead, the Scan Tool should reset when powered by vehicle battery, or turn off when powered by 9V battery. If the Scan Tool does not reset or turn off, the key is not working properly.

3.   Double press **ESC** to return to previous menu.

## Tool Information

1.   From **System Setup** menu, use the **Up/Down** scroll button to select **Tool Information**, then press the **ENTER** button.

```
┌─────────────────────────────────┐
│ ████████ Tool Information ███████ │
│ = = = = = = = = = = = = = = = = = = = = = = = = = = │
│ Serial No. :   00000006           │
│ Burn Date:    05/03/11            │
│ S/W Ver  :    V3.00               │
│ H/W Ver  :    V1.02               │
│ LIB Ver   :    V1.01              │
│                                    │
└─────────────────────────────────┘
```
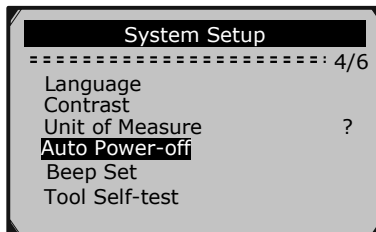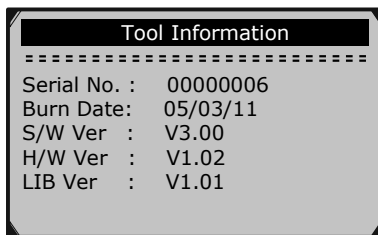
**Figure 3.18**

2.   When completed, press the **ESC** button to return to the previous screen.

## Update Mode

This function allows you to update the Scan Tool software and DTC library through a computer.

> • *Visit www.HarborFreight.com to update the Scan Tool software.*

## 3.9 9V Battery Replacement

When the 🗌 icon appears on the screen, replace the battery.

1.  Locate the battery cover on the back of the Scan Tool.

2.  Remove the battery cover screw and slide the battery cover off.

3.  Remove discharged battery and install a new 9V battery.

4.  Reinstall battery cover by sliding battery cover on and installing screw.

## 3.10 Vehicle Coverage

The 60794 Scan Tool is designed to work with all OBD II compliant vehicles, including those equipped with Control Area Network (CAN). It is required by EPA that all 1996 and newer vehicles (cars and light trucks) sold in the United States must be OBD II compliant and this includes all Domestic, Asian and European vehicles.

A small number of 1994 and 1995 model year gasoline vehicles are OBD II compliant. To verify if a 1994 or 1995 vehicle is OBD II compliant, check the Vehicle Emissions Control Information (VECI) Label which is located under the hood or by the radiator of most vehicles. If the vehicle is OBD II compliant, the label will designate "OBD II Certified". Additionally, Government regulations mandate that all OBD II compliant vehicles must have a "common" sixteen-pin DLC.

## 3.11 Product Troubleshooting

## Vehicle Linking Error

A communication error occurs if the Scan Tool fails to communicate with the vehicle's Engine Control Unit (ECU). You need to do the following to identify the error:

1.   Verify that the ignition is ON.

2.   Verify that the Scan Tool's OBD II connector is securely connected to the vehicle's DLC.

3.   Turn the ignition off and wait for about 10 seconds. Turn the ignition back to on and continue the testing.

## Operating Error

If the Scan Tool freezes, an exception occurs, or the vehicle's ECU is too slow to respond to requests, you need to reset the Scan Tool:

1.   Press and hold the **POWER** button for at least 2 seconds.

2.   Turn the ignition off and wait for about 10 seconds. Turn the ignition back to on and continue the testing.

## Scan Tool doesn't power up

If the Scan Tool won't power up or operates incorrectly in any other way, you need to do the following:

1.   Verify that the Scan Tool's OBD II connector is securely connected to the vehicle's DLC.

2.   Verify that the DLC pins are not bent or broken. Clean the DLC pins if necessary.

3.   Verify that the vehicle battery measures at least 8 volts.

# 4. Review Data

The **Review Data** function allows viewing of data
from the last test recorded by the Scan Tool.

1.  Use the **Up**/**Down** scroll button to select **Review Data**
    from **Main Menu**, then press the **ENTER** button.

```
┌──────────────────────────┐
│       Main Menu          │
│═════════════════════3/6  │
│   Diagnostics            │
│   DTC Lookup             │
│   Review Data        ?   │
│   Print Data             │
│   System Setup           │
│   Tool Information        │
└──────────────────────────┘
```
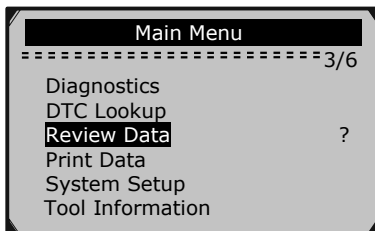
**Figure 4.1**

2.  Use the **Up/Down** scroll button to select the desired item
    from **Review Data** menu, then press the **ENTER** button.

```
┌──────────────────────────┐
│      Review Data         │
│═══════════════════ 1/4   │
│  I/M Readiness           │
│  Vehicle Info.           │
│  Modules Present     ?   │
│  Trouble codes (ABS)     │
│                          │
└──────────────────────────┘
```
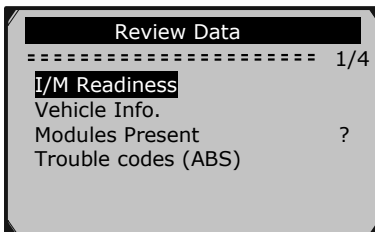
**Figure 4.2**

• If no data from a previously tested vehicle is recorded, only **Modules Present** data containing module ID and protocol type can be reviewed.

```
Review Data
======================1/1
Modules Present

                              ?
```
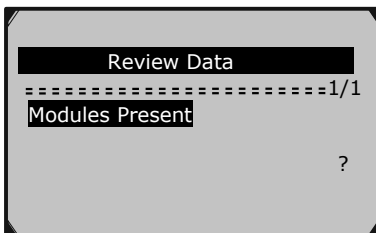
**Figure 4.3**

• Diagnostics results can be reviewed from this list only when any DTC is detected in previous tests.

3.    Review selected data on screen.

```
                              1/1
C1201
=========================

 Engine Control
 System Malfunction          ?
```
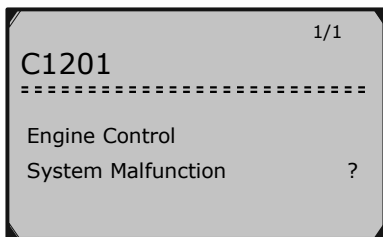
**Figure 4.4**

*NOTE: Data stored in a language different from current system settings of the Scan Tool will not be reviewable. Please adjust the language settings accordingly. A reminder will pop up under such circumstances.*

# 5. Diagnostics

When more than one vehicle control module is detected by the Scan Tool, you will be prompted to select the module where the data may be retrieved. The most often to be selected are the Powertrain Control Module (PCM) and Transmission Control Module (TCM).

*CAUTION: Don't connect or disconnect any test equipment with ignition on or engine running.*

1. Turn the ignition off.

2. Locate the vehicle's DLC.

3. Plug the Scan Tool's OBD II connector into the vehicle's DLC.

4. Turn the ignition on. Engine can be off or running.

5. Turn on the Scan Tool by pressing the **Power** button. Use the **Up/Down** scroll button to select **Diagnostics** from the **Main Menu.**

```
┌─────────────────────────┐
│       Main Menu         │
│ ===================== 1/6 │
│ Diagnostics             │
│ DTC Lookup              │
│ Review Data         ?   │
│ Print Data              │
│ System Setup            │
│ Tool Information        │
└─────────────────────────┘
```
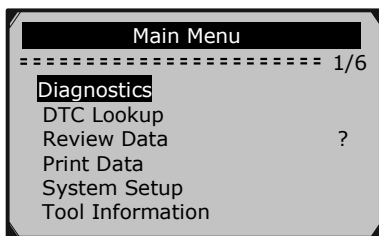
**Figure 5.1**

6.  Press the **ENTER** button to wait for the Menu to appear.
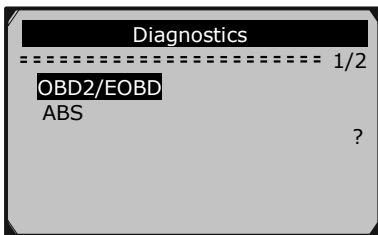


**Figure 5.2**

7.  Select **OBD2/EOBD** and wait for a few seconds; a sequence of messages displaying the OBD II protocols will be observed on the display until the vehicle protocol is detected.

    • *If the Scan Tool fails to communicate with the vehicle's ECU more than three times, a "LINKING ERROR!" message shows up on the display.*

    a. Verify that the ignition is ON

    b. Check if the Scan Tool's OBD II connector is securely connected to the vehicle's DLC

    c. Verify that the vehicle is OBD II compliant

    d. Turn the ignition off and wait for about 10 seconds. Turn the ignition back to on and repeat the procedure from step 5.

    • *If the "LINKING ERROR!" message does not go away, have the tool inspected by a qualified technician.*

8.    You will be prompted to erase previously stored data.

      *• Review previously stored data*
      *thoroughly before erasing.*

```
┌─────────────────────────────────┐
│          Diagnostic             │
│=================================│
│       Erase previously          │
│       stored data to save       │
│       data from this test?      │
│                                 │
│                                 │
│     YES          NO             │
└─────────────────────────────────┘
```
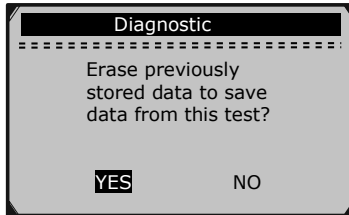
**Figure 5.3**

9.    If you wish to erase the data, press the **ENTER** button; if
      you do not want to erase the data, press **ESC** to exit or use
      **Left/ Right** button to select **NO** and press **ENTER** to continue.

10.   View a summary of the **System Status.** Wait a few seconds
      or press any key for **Diagnostic Menu** to come up.

```
┌─────────────────────────────────┐
│         System Status           │
│=================================│
│  MIL Status            ON        │
│  Codes Found           6         │
│  Monitors N/A          3         │
│  Monitors OK           3         │
│  Monitors INC          5         │
│                                 │
└─────────────────────────────────┘
```
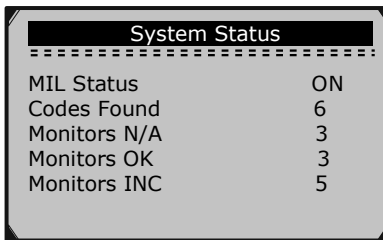
**Figure 5.4**

*• If more than one module is detected, you will be prompted to select a module before testing.*

```
┌─────────────────────────────┐
│       Control Module        │
│ ===================== : 1/2 │
│ [Engine]                    │
│  Module $A4              ?  │
│                             │
│                             │
│                             │
└─────────────────────────────┘
```
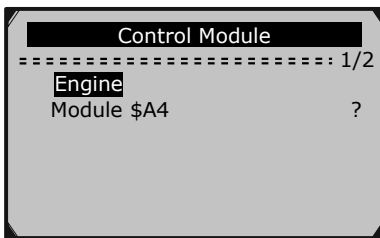
**Figure 5.5**

• Use the **Up/Down** scroll button to select a module then press the **ENTER** button.

## 5.1 Reading Codes

• Reading Codes can be done with the key on engine off (KOEO) or with the key on engine running (KOER).

• **Stored Codes** are also known as "hard codes" or "permanent codes", These codes will cause the control module to illuminate the (MIL) when an emission-related fault occurs.

• **Pending Codes** are also referred to as "maturing codes" or "continuous monitor codes". They indicate problems that the control module has detected during the current or last driving cycle but are not considered serious yet. Pending Codes will not turn on the MIL. If the fault does not occur within a certain number of warm-up cycles, the DTC clears from memory.

• **Permanent Codes** are DTCs that are "confirmed" and are retained in the non-volatile memory of the vehicle's on-board computer until the appropriate monitor for each DTC has determined that the malfunction is no longer present and is not commanding the MIL on.

1.  Use **Up/Down** scroll button to select **Read Codes** from **Diagnostic Menu** and press **ENTER** button.

```
┌─────────────────────────────┐
│      Diagnostic Menu        │
│ ==================== 1/11   │
│ Read Codes              ⬆   │
│ Erase Codes                 │
│ Live Data               ?   │
│ View Freeze Frame           │
│ I/M Readiness               │
│ O2 Monitor Test         ⬇   │
└─────────────────────────────┘
```
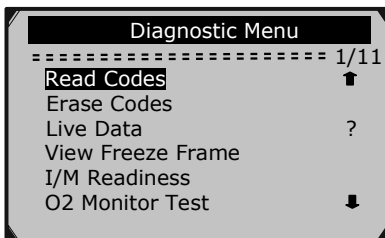
**Figure 5.6**

2.  Use the **Up/Down** scroll button to select **Stored Codes** or **Pending Codes** from the **Read Codes** menu then press the **ENTER** button.

```
┌─────────────────────────────┐
│       Trouble Codes         │
│ ==================== 1/3    │
│ Stored Codes                │
│ Pending Codes               │
│ Permanent Codes         ?   │
│                             │
│                             │
│                             │
└─────────────────────────────┘
```
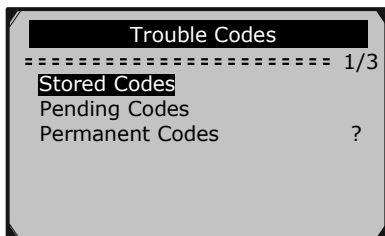
**Figure 5.7**

If there is not a DTC, the display indicates "**No (pending) codes are stored in the module!**" Wait a few seconds or press any key to return to previous screen.

***NOTE:** **The Permanent Codes function is available only for vehicles supporting the CAN protocols.***

3. View the DTCs and their definitions on the screen.

```
                            1/1
   P1633   $10      BUICK
======================
 Ignition 0 Switch Circuit
                      ?
```
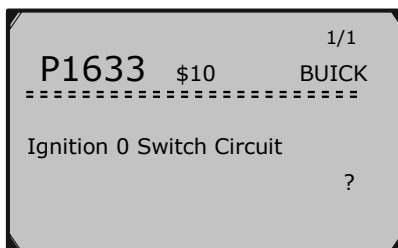
**Figure 5.8**

4. If more than one DTC is found, use the **Left/ Right** scroll button to check all the codes.

   • If retrieved DTCs contain any manufacturer specific or enhanced codes, a "**Manufacturer specific codes are found! Press any key to select vehicle make!**" message comes up prompting you to select vehicle manufacturer to view DTC definitions. Use **Up/Down** scroll button to select manufacturer and then press **ENTER** button to confirm.

```
    Vehicle Manufacturer
==================== 1/28
 BUICK                ▲
 BMW
 CADILLAC             ?
 CHEVROLET
 CHRYSLER
 FORD                 ▼
```
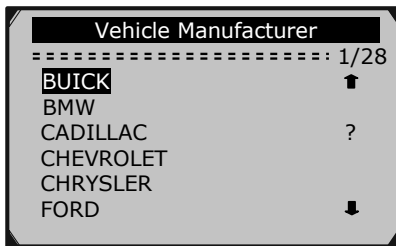
**Figure 5.9**

   • If the manufacturer of your vehicle is not listed, use the **Up/Down** scroll button to select **Other** then press the **ENTER** button.

## 5.2 Code Breaker

The **Code Breaker** function is used to provide descriptions and helpful tips to deal with DTCs stored in "Stored Codes".

1.  Repeat steps in section **"5.1 Reading Codes" on page 31**, to identify DTCs.
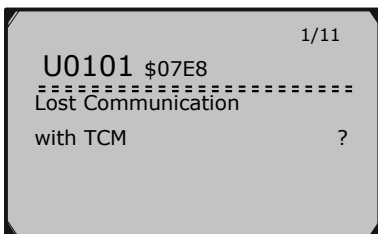


**Figure 5.10**

2.  Press the **?** button to display **Code Breaker** menu.
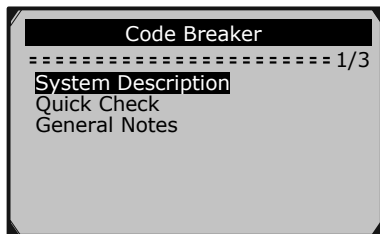


**Figure 5.11**

3.  Click on **System Description** and **Quick Check** to read detailed descriptions of DTC.

4.  Click on **General Notes** to view helpful repair information of DTCs.

5.  To return to previous screen, press **ESC** button.

## 5.3 Erasing Codes

*CAUTION: Erasing the DTCs may allow the Scan Tool to delete not only the codes from the vehicle's on-board computer, but also Freeze Frame Data and manufacturer specific enhanced data. Further, the I/M Readiness Monitor Status for all vehicle monitors is reset to Not Ready or Not Complete status. Do not erase the codes before the system has been checked completely by a technician.*

*• This function is performed with key on engine off (KOEO). Do not start the engine.*

1.  Use the **Up/Down** scroll buttons to select **Erase Codes** from **Diagnostic Menu** then press the **ENTER** button.

```
        Diagnostic Menu
======================= 2/11
Read Codes                 ⬆
Erase Codes
Live Data                ?
View Freeze Frame
I/M Readiness
O2 Monitor Test            ⬇
```
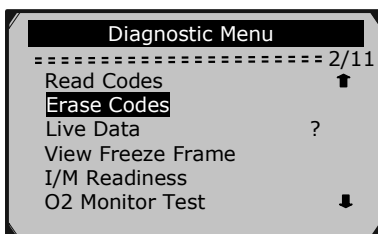
**Figure 5.12**

2.  A warning message comes up asking for your confirmation.

```
          Erase Codes
=========================
      Erase trouble codes!
        Are you sure?



     YES        NO
```
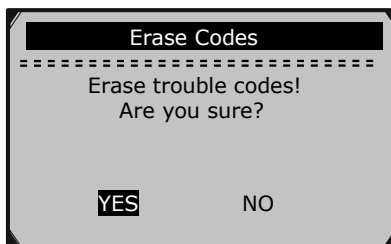
**Figure 5.13**

• If you do not want to proceed with erasing codes, press **ESC** button or use **Left/Right** scroll button to select **NO** to exit. A message of **"Command Cancelled!"** will appear. Wait a few seconds or press any key to return to **Diagnostic Menu**.

3.   Press the **ENTER** button to confirm.

• If the codes are cleared successfully, an **"Erase Done!"** confirmation message shows on the display.

```
┌─────────────────────────────┐
│        Erase Codes          │
│ = = = = = = = = = = = = = = |
│                             │
│         Erase Done!         │
│                             │
│                             │
│      Press any key to con.  │
│                             │
└─────────────────────────────┘
```
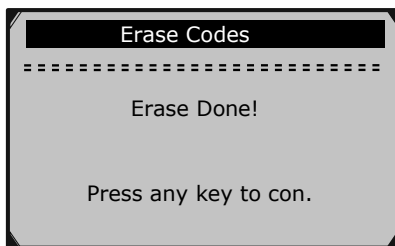
**Figure 5.14**

• If the codes are not cleared, then an "**Erase Failure. Turn Key on with Engine off!"** message appears

```
┌─────────────────────────────┐
│        Erase Codes          │
│ = = = = = = = = = = = = = = |
│        Erase Failure.       │
│        Turn Key on with     │
│        Engine Off!          │
│                             │
│      Press any key to con.  │
│                             │
└─────────────────────────────┘
```
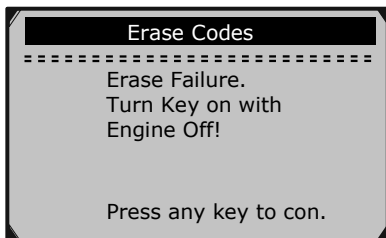
**Figure 5.15**

*Clearing the error code will not repair the car.*
*Repair the car, then clear the error code.*

4.   Press any button to return to **Diagnostic Menu.**

## 5.4 Viewing Data

## Viewing Live Data

1.  To view **Live Data**, use the **Up/Down** scroll button to select **Live Data** from the **Diagnostic Menu** then press the **ENTER** button.

```
┌─────────────────────────────┐
│      Diagnostic Menu        │
│ ====================== 3/11 │
│   Read Codes            ↑   │
│   Erase Codes               │
│   Live Data             ?   │
│   View Freeze Frame         │
│   I/M Readiness             │
│   O2 Monitor Test       ↓   │
└─────────────────────────────┘
```
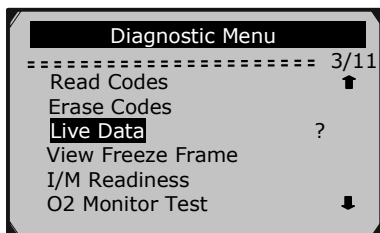
**Figure 5.16**

2.  Wait a few seconds while the Scan Tool validates the PID.

```
┌─────────────────────────────┐
│         Live Data           │
│ ======================      │
│                             │
│      Reading PID.01         │
│      - Please Wait -        │
│                             │
│                             │
└─────────────────────────────┘
```
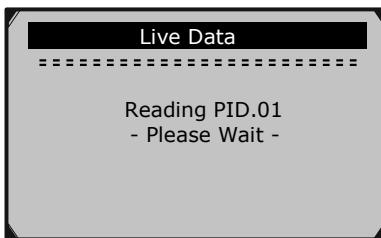
**Figure 5.17**

3. Use the **Up/Down** scroll button to select **View Data** from **Live Data** menu then press the **ENTER** button.

```
┌─────────────────────────────┐
│        Live Data            │
│ ==================== 1/3    │
│ View Data                   │
│  Record Data           ?    │
│  Playback Data              │
│                             │
│                             │
└─────────────────────────────┘
```
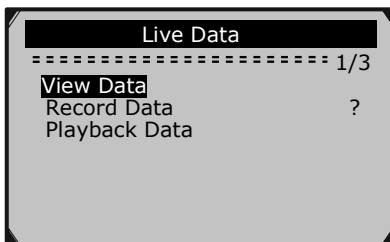
**Figure 5.18**

## Viewing Complete Data Set

1. To view a complete set of data, use **Up/Down** scroll button to select **Complete Data Set** from **View Data** menu then press the **ENTER** button.

```
┌─────────────────────────────┐
│        View Data            │
│ ==================== 1/3    │
│ Complete Data Set           │
│  Custom Data Set            │
│  Unit of Measure       ?    │
│                             │
│                             │
└─────────────────────────────┘
```
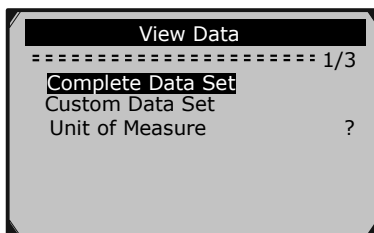
**Figure 5.19**

2.    View live PIDs on the screen. Use the **Up/Down** scroll button
      for more PIDs if an ▼ or ▲ arrow appears on the screen. .



| Live Data | |
|---|---|
| ═══════════════════ | 6 |
| DTC_CNT | 0 ▲ |
| FUELSYS1 | 0L |
| FUELSYS2 | -- ? |
| LOAD_PCT (%) | 0.0 |
| ETC(  ) | -40 |
| SHRTFT1 (%) | 99.2 ▼ |
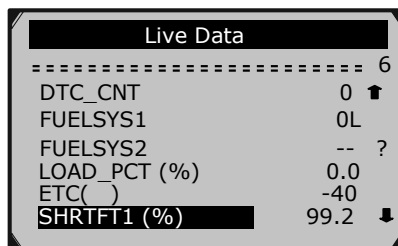
**Figure 5.20**

• The number x to the top right of the screen
indicates sequence of the highlighted item.

• To view full name of the highlighted PID, press the **?** button.

• If the **G** icon appears when a PID is highlighted, graphic
information is available. Press **ENTER** to view graph.



RPM (/min)          975

1725

925
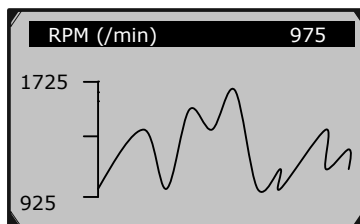
**Figure 5.21**

3.    Press the **ESC** button to return to previous menu.

## Viewing Custom Data Set

1.  To view customized PID data, use the **Up/Down** scroll button to select **Custom Data Set** from **View Data** menu then press the **ENTER** button.

```
┌─────────────────────────────┐
│        View Data            │
│ ======================2/3   │
│   Complete Data Set         │
│   Custom Data Set           │
│   Unit of Measure        ?  │
│                             │
│                             │
└─────────────────────────────┘
```
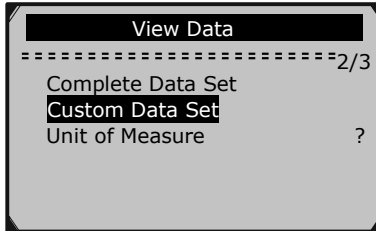
**Figure 5.22**

2.  Observe on-screen instructions.

```
┌─────────────────────────────┐
│      Custom Data Set        │
│ ========================    │
│   [➡] – Select/Deselect     │
│   [⬅] – Deselect all        │
│   [ENTER] – Confirm         │
│   [ESC] - Cancel            │
│                             │
└─────────────────────────────┘
```
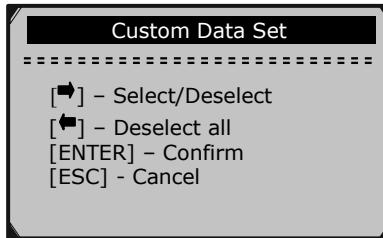
**Figure 5.23**

3.  Use the **Right** button to deselect/select data parameters, and use the **Up/Down** scroll button to move up and down. Selected parameters are marked with solid squares.

```
┌─────────────────────────────┐
│      Custom Data Set        │
│ ==================== 4/25   │
│  *DTC_CNT        #01    ⬆   │
│   FUELSYS1                  │
│  *FUELSYS2       #02    ?   │
│  *LOAD_PCT       #03       │
│   ETC(  )                  │
│   SHRTFT1               ⬇   │
└─────────────────────────────┘
```

**Figure 5.24**

• The numbers x/y in the upper right corner = where x indicates sequence of highlighted item and y indicates the order that the parameters are selected and will be displayed.

• If you want to deselect all marked items or select all items, press the **LEFT** button. A message comes up to ask for your confirmation.

```
┌─────────────────────────────┐
│        Deselect All         │
│ ═══════════════════════════ │
│         Deselect all        │
│       selected PID's?       │
│                             │
│      YES        NO          │
│                             │
└─────────────────────────────┘
```
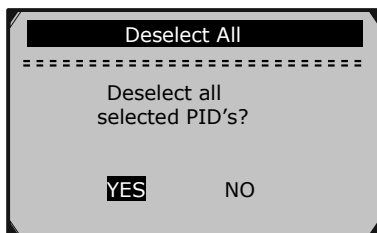
**Figure 5.25**

• If you decide to deselect these items, press **ENTER;** if you decide not to, press **ESC** or use the **Up/Down** scroll button to select **NO** to continue PID selections.

4.  Press the **ENTER** button to view selected PIDs on screen.

```
┌─────────────────────────────┐
│          Live Data          │
│ ═════════════════════════ 4 │
│   DTC_CNT            0       │
│   FUELSYS2          0L       │
│   ETC(  )          -40     ? │
│   SHRTFT1 (%)      99.2      │
│                             │
└─────────────────────────────┘
```

**Figure 5.26**

5.  Use the **ESC** button to return to previous menu.

## Recording Data

The **Record Data** function allows recording vehicle modules' PIDs to help diagnose intermittent vehicle problems. A recording includes 5 frames of live data before trigger event and several frames after trigger event.

There are two trigger modes used to record data:

1.  **Manual Trigger -** allows user to press the **ENTER** button to start recording.

2.  **DTC Trigger -** automatically records PID data when a fault that causes a DTC to set is detected by vehicle.

*CAUTION: DO NOT try to drive and operate the Scan Tool at the same time! Always have another person operate the Scan Tool while driving.*

1.  To record live data, use the **Up/Down** scroll button to select **Record Data** from **Live Data** menu then press the **ENTER** button.

```
┌─────────────────────────┐
│        Live Data        │
│ ==================== 2/3 │
│   View Data             │
│   Record Data           │
│   Playback Data       ? │
│                         │
│                         │
└─────────────────────────┘
```
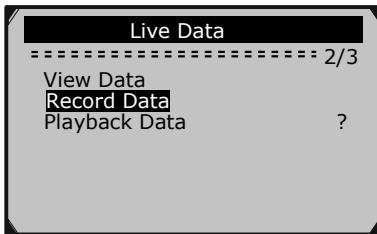
**Figure 5.27**

## Recording Complete Data Set

1.  To record a complete set of live data, use the **Up/ Down** scroll button to select **Complete Data Set** from **Record Data** menu then press the **ENTER** button.
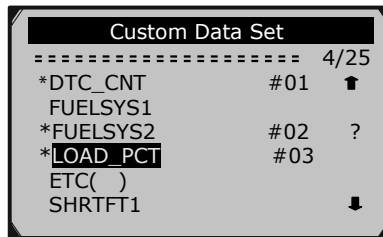
```
┌─────────────────────────┐
│       Record Data       │
│ ===================== 1/3│
│ Complete Data Set       │
│ Custom Data Set         │
│ Unit of Measure       ? │
│                         │
│                         │
└─────────────────────────┘
```
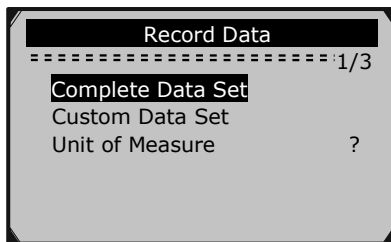
**Figure 5.28**

2.  Use the **Up/Down** scroll button to select a trigger mode then press the **ENTER** button.

```
┌─────────────────────────┐
│     Pick Trigger Mode   │
│ ===================== 1/2│
│ Manual Trigger          │
│ DTC Trigger           ? │
│                         │
│                         │
│                         │
└─────────────────────────┘
```

**Figure 5.29**

• If data from previously tested vehicle is not erased, data from current test will be stored in a temporary cache.

3. Use the **Up/Down** scroll button to select a memory location then press the **ENTER** button.

```
        Select Memory
===================== 1/3
Location #1             *
Location #2
Location #3             ?
```

**Figure 5.30**

• The asterisk (*) icon on the screen indicates that there is a previous recording in the memory location.

• If you select a location marked with an asterisk (*) icon, a message prompting to overwrite old recording displays.

```
        Select Memory
=========================
     A previous recording
     exists! Do you want
      to overwrite it?

     YES          NO
```
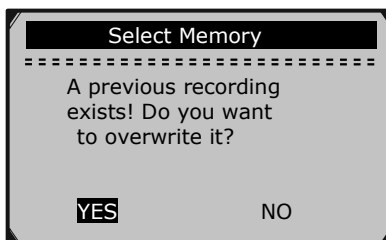
**Figure 5.31**

• If you wish to proceed with overwriting the old recording, press the **ENTER** button; if you do not wish to overwrite it, use the **Left/Right** button to select **NO** or press the **ESC** button to pick another memory location.

4.   Observe on-screen instructions.

   • If **Manual Trigger** is selected, the following screen shows:

```
┌─────────────────────────────┐
│      Manual Trigger         │
│ = = = = = = = = = = = = = = │
│      Ready to record!       │
│      Press [ENTER] to       │
│      start recording…       │
│                             │
│      Press [ESC] to exit    │
│                             │
└─────────────────────────────┘
```
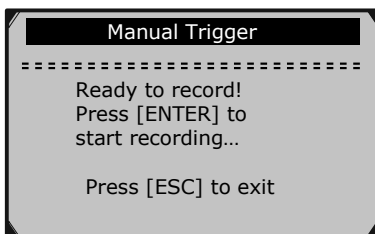
**Figure 5.32**

   • If **DTC Trigger** is selected, following screen shows:

```
┌─────────────────────────────┐
│        DTC Trigger          │
│ = = = = = = = = = = = = = = │
│      Waiting for DTC to     │
│      trigger recording…     │
│                             │
│      Press [ESC] to exit    │
│                             │
└─────────────────────────────┘
```

**Figure 5.33**

5.   Wait for DTC to trigger recording or
     press **ENTER** to start recording.

***Note:*** ***Drive until a DTC is detected when DTC***
***Trigger is selected. If no DTCs are detected,***
***press ESC to exit recording.***

```
 Recording...            5/46
========================= 6
  DTC_CNT            0     ↑
  FUELSYS1           0L
  FUELSYS2           --    ?
  LOAD_PCT(%)        0.0
  ETC(  )            -40
  SHRTFT1(%)         99.2  ↓
```
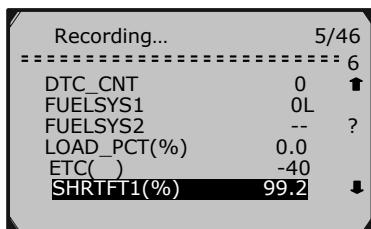
**Figure 5.34**

•The numbers x/y in the upper right corner =
where x indicates the number of recorded frames and
y indicates the maximum frames that can be recorded.

6.  The Scan Tool keeps recording PID data until
    user presses the **ESC** button, selected memory
    location is full, or it completes recording. A message
    prompting to playback data shows on the screen.

```
 Record Data
=========================
        Record Done!
        Playback data?



    YES            NO
```
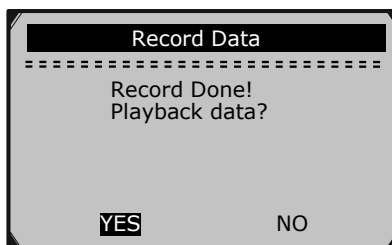
**Figure 5.35**

• If you wish to playback recorded data, press the **ENTER**
button; if you do not wish to playback, press the **ESC**
button, or use **Left/Right** button to select **NO** then press
the **ENTER** button to return to **Record Data** menu.
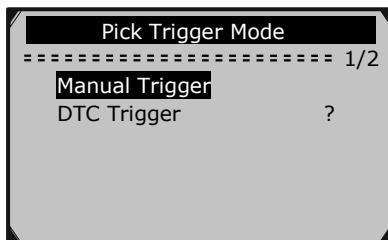
## Recording Custom Data Set

1.    To record customized data, use the **Up/Down** scroll button to select **Custom Data Set** from **Record Data** menu then press the **ENTER** button.

```
Record Data
= = = = = = = = = = = = = = = = = = = = = = 2/3
    Complete Data Set
    Custom Data Set
    Unit of Measure                  ?
```
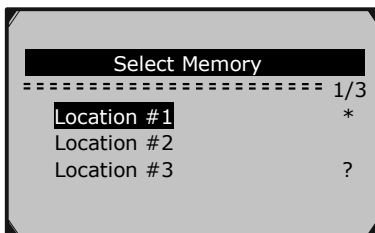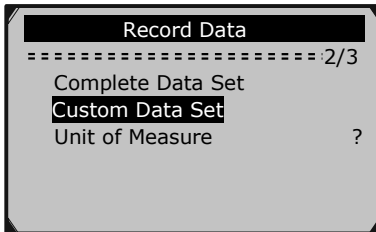
**Figure 5.36**

2.    Observe on-screen instructions. Press the **ENTER** button to continue; press the **ESC** button, or use **Left/Right** button to select **NO** then press the **ENTER** button to return to **Record Data** menu.

```
Custom Data Set
= = = = = = = = = = = = = = = = = = = = = = = =
    [➡] – Select/deselect
    [⬅] – Deselect all
     [ENTER] – Confirm
     [ESC] – Cancel

    YES              NO
```
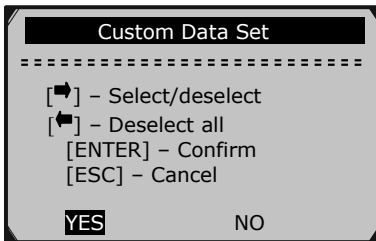
**Figure 5.37**

3. Use the **RIGHT** button select/deselect data parameters. Selected parameters are marked with solid squares. Press the **ENTER** button to confirm.

```
┌─────────────────────────────┐
│      Custom Data Set        │
│ ==================== 6/25   │
│  *DTC_CNT        #01     ↑  │
│   FUELSYS1                  │
│  *FUELSYS2       #02     ?  │
│  *LOAD_PCT       #03        │
│   ETC                       │
│  SHRTFT1                 ↓  │
└─────────────────────────────┘
```
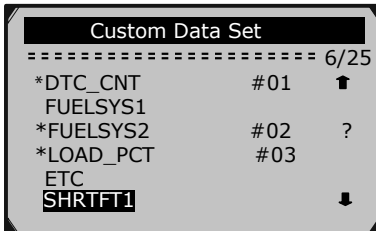
**Figure 5.38**

• If you wish to deselect all marked items, press **LEFT** button.

• A message comes up to ask for your confirmation.

```
┌─────────────────────────────┐
│       Deselect All          │
│ ===========================  │
│        Deselect all         │
│       selected PIDs?        │
│                             │
│      YES      NO            │
└─────────────────────────────┘
```
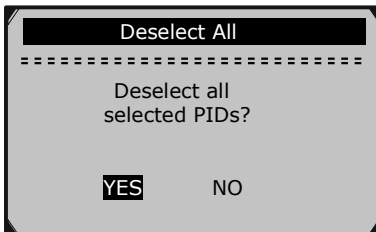
**Figure 5.39**

• If you decide to deselect these items, press **ENTER**; if you decide not to, press the **ESC** button, or use the **Up/Down** button to select **NO** and press **ENTER** to continue PID selections.

4. Use the **Up/Down** scroll button to select a **Trigger Mode** then press the **ENTER** button.

```
┌─────────────────────────────────┐
│     Pick Trigger Mode           │
│===================== 1/2        │
│ Manual Trigger                  │
│ DTC Trigger            ?        │
│                                 │
│                                 │
│                                 │
└─────────────────────────────────┘
```
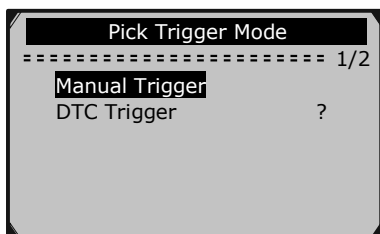
**Figure 5.40**

• If data from a previously tested vehicle is not erased, data from current test will be stored in temporary cache.

5.     Use the **Up/Down** scroll button to select a **Memory Location** then press the **ENTER** button.

```
┌─────────────────────────────────┐
│       Select Memory             │
│===================== 1/3        │
│ Location #1            *         │
│ Location #2                     │
│ Location #3            ?         │
│                                 │
│                                 │
└─────────────────────────────────┘
```
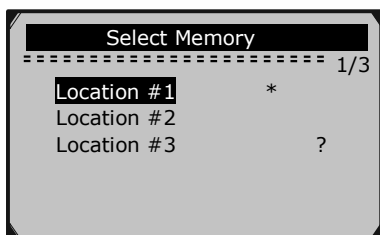
**Figure 5.41**

•The asterisk (*) icon on the screen indicates that there is a previous recording in the memory location.

• If you select a location marked with an asterisk (*) icon, a message prompting to overwrite old recording is displayed.

```
 ┌──────────────────────────────┐
 │  Select Memory               │
 │ ========================     │
 │   A previous recording       │
 │   exists! Do you want        │
 │    to overwrite it?          │
 │                              │
 │  YES          NO             │
 └──────────────────────────────┘
```
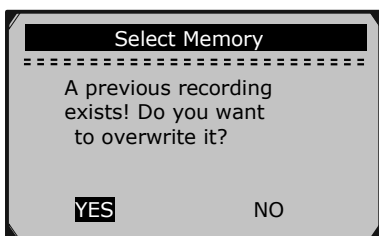
**Figure 5.42**

• If you wish to proceed with overwriting old recording, press the **ENTER** button; if you do not wish to overwrite it, press the **ESC** button, or use the **Left/Right** button to select **NO** and press **ENTER** to pick another memory location.

6. Observe on-screen instructions.

   • If **Manual Trigger** is selected, following screen shows:

```
 ┌──────────────────────────────┐
 │  Manual Trigger              │
 │ ========================     │
 │   Ready to record!           │
 │   Press [ENTER] to           │
 │   start recording…           │
 │                              │
 │   Press [ESC] to exit        │
 └──────────────────────────────┘
```
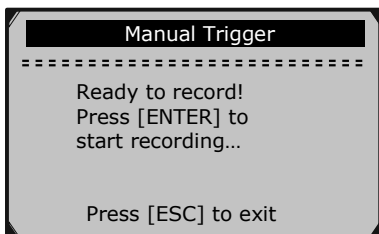
**Figure 5.43**

   • If DTC Trigger is selected, following screen shows:

```
┌─────────────────────────────┐
│      DTC Trigger            │
│ = = = = = = = = = = = = =   │
│     Waiting for DTC to      │
│     trigger recording…      │
│                             │
│                             │
│     Press [ESC] to exit     │
└─────────────────────────────┘
```

**Figure 5.44**

7.  Wait for DTC to trigger recording or
    press **ENTER** to start recording.

```
┌─────────────────────────────┐
│  Recording…         32/283  │
│ = = = = = = = = = = = =   6 │
│  DTC_CNT            0     ↑  │
│  FUELSYS1           0L       │
│  FUELSYS2           --    ? │
│  LOAD_PCT(%)        0.0      │
│  ETC( )             -40      │
│  SHRTFT1(%)         99.2  ↓ │
└─────────────────────────────┘
```
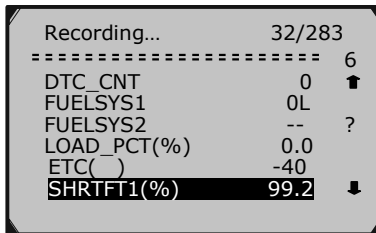
**Figure 5.45**

8.  The Scan Tool keeps recording PID data until
    user presses **ESC** button, the selected memory
    location is full, or it completes recording. A message
    prompting to playback data shows on the screen.

```
┌─────────────────────────────┐
│      Record Data            │
│ = = = = = = = = = = = = =   │
│     Record Done!            │
│     Playback data?          │
│                             │
│                             │
│   YES           NO          │
└─────────────────────────────┘
```
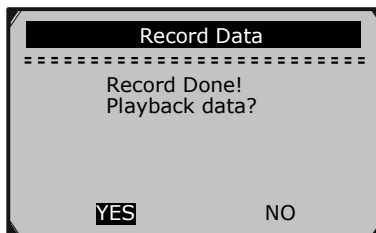
**Figure 5.46**

• If you wish to playback recorded data, press the **ENTER** button; if you do not wish to playback, press the **ESC** button, or use the **Left/Right** button to select **NO** then press the **ENTER** button to return to **Record Data** menu.

```
┌─────────────────────────────┐
│      Record Data            │
│ = = = = = = = = = = = = = = 1/3 │
│   Complete Data Set         │
│   Custom Data Set           │
│   Unit of Measure      ?    │
│                             │
└─────────────────────────────┘
```
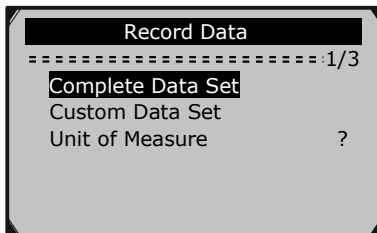
**Figure 5.47**

## Playback Data

The **Playback Data** function allows viewing of previously stored PID data.

1.    To playback recorded data, use the **Up/Down** scroll button to select **Playback Data** from **Live Data** menu then press the **ENTER** button.

```
┌─────────────────────────────┐
│      Live Data              │
│ = = = = = = = = = = = = = = 3/3 │
│   View Data                 │
│   Record Data               │
│   Playback Data        ?    │
│                             │
└─────────────────────────────┘
```
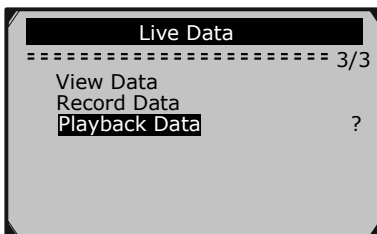
**Figure 5.48**

• You are also allowed to playback recorded data immediately after recording.

2. Use the **Up/Down** button to select the memory
location marked with an asterisk (*) icon.
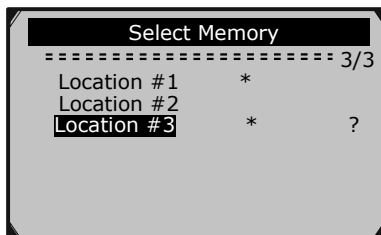


**Figure 5.49**

• If there is no recording in selected location, a message "**Not
Supported or Stored No Data**" displays on the screen.

3. Use the **Up/Down** button to view
recorded PIDs of each frame.
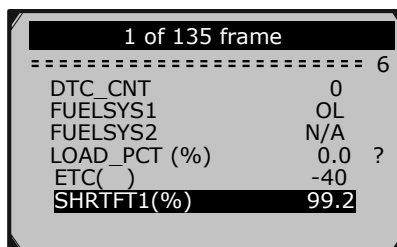


**Figure 5.50**

4.    Use the **Left/Right** button to view PIDs
      of next or previous frames.

```
          6 of 135 frame
======================= 4
  DTC_CNT              0
  FUELSYS1            OL
  FUELSYS2           N/A
 LOAD_PCT(%)         0.0   ?
  ETC(  )            -40
  SHRTFT1(%)        99.2
```
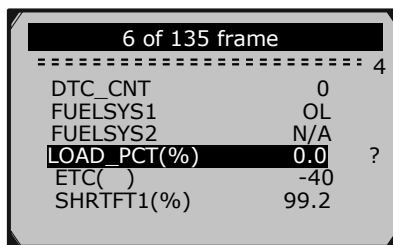
**Figure 5.51**

## 5.5 Viewing Freeze Frame Data

1.    To view **Freeze Frame** data, use the **Up/Down**
      scroll button to select **View Freeze Frame** from
      **Diagnostic Menu** then press the **ENTER** button.

```
        Diagnostic Menu
==================== 4/11
  Read Codes              ⬆
  Erase Codes
  Live Data               ?
 View Freeze Frame
  I/M Readiness
  O2 Monitor Test         ⬇
```
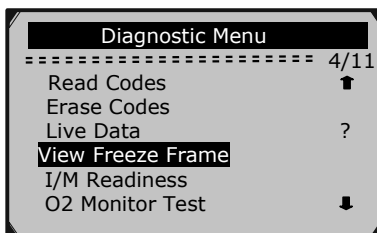
**Figure 5.52**

2.    Wait a few seconds while the Scan Tool validates the PID.

3.    If retrieved information covers more than one screen,
      then a down arrow will appear. Use the **DOWN** scroll
      button, as necessary, until all the data appears.

```
┌─────────────────────────────┐
│     View Freeze Frame       │
│ ==================== 2      │
│  DTCFRZF          P1633  ↑  │
│  FUELSYS1            OL      │
│  FUELSYS2           --       │
│  LOAD_PCT (%)      0.0  ?   │
│  ECT(  )            -40      │
│  SHRTFT1 (%)       99.2  ↓  │
└─────────────────────────────┘
```

**Figure 5.53**

• If there is no freeze frame data available,
an advisory message "**No freeze frame
data stored!**" shows on the display.

4.  If you want to view full name of a PID, use the **Up/Down**
    scroll button to select the PID, then press the **HELP** button.

```
┌─────────────────────────────┐
│          FUELSYS1           │
│ ========================    │
│                             │
│    Fuel System 1 Status     │
│                             │
│                             │
│                             │
└─────────────────────────────┘
```
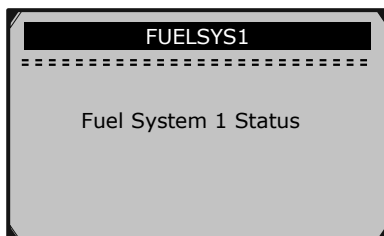
**Figure 5.54**

5.  Press **ESC** button to return to previous screen.

## 5.6 Retrieving I/M Readiness Status

The **I/M Readiness Status** function is used to check the operations of the Emission System on OBD II compliant vehicles. It is an excellent function to use prior to having a vehicle inspected for compliance to a state Emissions Program. Some of the latest vehicle models may support two types of **I/M Readiness** tests:

> **• Since DTCs Cleared** - indicates status of the monitors since the DTCs are erased.

> **• This Drive Cycle** - indicates status of monitors since the beginning of the current drive cycle.

An I/M Readiness Status result of **"NO"** does not necessarily indicate that the vehicle being tested will fail the state I/M inspection. For some states, one or more such monitors may be allowed to be "Not Ready" to pass the Emissions Test.

1. Use the **Up/Down** scroll button to select **I/M Readiness** from **Diagnostic Menu** and press **ENTER** button.

```
┌─────────────────────────────┐
│      Diagnostic Menu        │
│ = = = = = = = = = = = = 5/11│
│  Read Codes              ↑  │
│  Erase Codes                │
│  Live Data               ?  │
│  View Freeze Frame          │
│  I/M Readiness              │
│  O2 Monitor Test         ↓  │
└─────────────────────────────┘
```
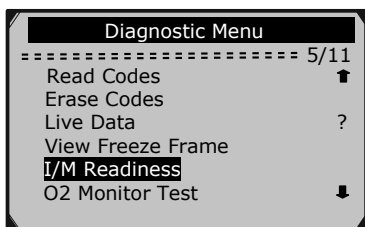
**Figure 5.55**

2. Wait a few seconds while the Scan Tool validates the PID.

3.    If the vehicle supports both types of tests, then both
      types will be shown on the screen for selection.

```
┌─────────────────────────────┐
│        I/M Readiness         │
│ ==================== 1/2     │
│ Since DTCs Cleared           │
│ This Drive Cycle          ?  │
│                              │
│                              │
│                              │
└─────────────────────────────┘
```
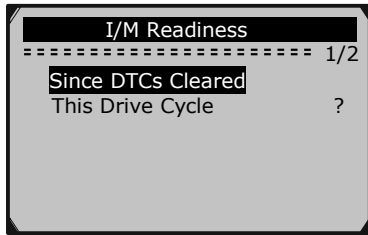
**Figure 5.56**

4.    Use the **Up/Down** scroll button, as necessary,
      to view the status of the MIL light (**"ON" or
      "OFF"**) and the following monitors:

   - **Misfire Monitor** -- Misfire monitor

   - **Fuel System Mon** -- Fuel System Monitor

   - **Comp. Component** -- Comprehensive Component Monitor

   - **Catalyst Mon** -- Catalyst Monitor

   - **Htd Catalyst** -- Heated Catalyst Monito**r**

   - **EVAP System Mon** -- Evaporative System Monitor

   - **Sec Air System** -- Secondary Air Monitor

   - **A/C Refrig Mon** -- A/C system Monitor

   - **Oxygen Sens Mon** -- O2 Sensors Monitor

   - **Oxygen Sens Htr** --O2 Sensor Heater Monitor

   - **EGR System Mon** -- EGR System Monitor

```
┌─────────────────────────────────┐
│      Since DTCs Cleared         │
│=======================: 1       │
│ MIL Status         OFF     ↑    │
│ Misfire Monitor    OK           │
│ Fuel System Mon    OK      ?    │
│ Comp. Component    OK           │
│ Catalyst Mon       INC          │
│ Htd Catalyst       N/A     ↓    │
└─────────────────────────────────┘
```

**Figure 5.57**

5.    If the vehicle supports readiness test of "**This Drive
      Cycle**", a screen of the following displays:

```
┌─────────────────────────────────┐
│        This Drive Cycle         │
│======================= 1        │
│ MIL Status         OFF     ↑    │
│ Misfire Monitor    OK           │
│ Fuel System Mon    N/A     ?    │
│ Comp. Component    OK           │
│ Catalyst Mon       INC          │
│ Htd Catalyst       N/A     ↓    │
└─────────────────────────────────┘
```

**Figure 5.58**

## 5.7 O2 Monitor Test

OBD II regulations set by SAE require that relevant vehicles
monitor and test the oxygen (O2) sensors to identify problems
related to fuel efficiency and vehicle emissions. These tests
are not on-demand tests and they are done automatically when
engine operating conditions are within specified limits. These test
results are saved in the vehicle's on-board computer's memory.

The **O2 Monitor Test** function allows retrieval and viewing
of O2 sensor monitor test results for the most recently
performed tests from the vehicle's on-board computer.

**The O2 Monitor Test function is not supported by vehicles which communicate using a controller area network (CAN). For O2 Monitor Test results of CAN-equipped vehicles, see "5.8 On-Board Monitor Test" on page 61.**

1.    Use the **Up/Down** scroll button to select **O2 Monitor Test** from **Diagnostic Menu** and press **ENTER** button.

```
┌─────────────────────────────┐
│       Diagnostic Menu        │
│ ==================== 6/11    │
│   Read Codes              ⬆  │
│   Erase Codes                │
│   Live Data              ?   │
│   View Freeze Frame          │
│   I/M Readiness              │
│  O2 Monitor Test          ⬇  │
└─────────────────────────────┘
```
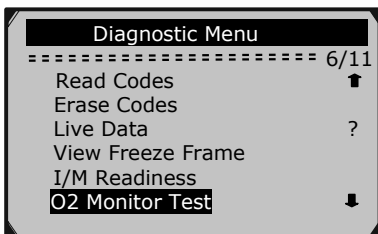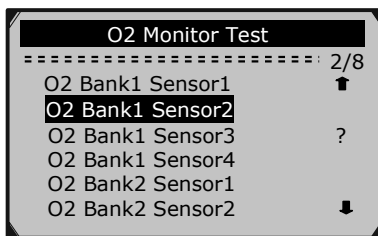
**Figure 5.59**

2.    Wait a few seconds while the Scan Tool validates the PID.

3.    Use the **Up/Down** scroll button to select an O2 sensor from **O2 Monitor Test** menu and press **ENTER** button.

```
┌─────────────────────────────┐
│       O2 Monitor Test        │
│ ==================== 2/8     │
│   O2 Bank1 Sensor1        ⬆  │
│  O2 Bank1 Sensor2            │
│   O2 Bank1 Sensor3        ?  │
│   O2 Bank1 Sensor4           │
│   O2 Bank2 Sensor1           │
│   O2 Bank2 Sensor2        ⬇  │
└─────────────────────────────┘
```

**Figure 5.60**

• If the vehicle does not support the mode, an advisory message will be displayed on the screen.

```
┌──────────────────────────────────┐
│         O2 Monitor Test          │
│ = = = = = = = = = = = = = = = = = = = = = = = │
│         The selected mode is     │
│           not supported!         │
│                                  │
│                                  │
│         Press any key to con.    │
└──────────────────────────────────┘
```

**Figure 5.61**

4.    View test results of selected O2 sensor.

```
┌──────────────────────────────────┐
│         O2 Bank1 Sensor2         │
│ = = = = = = = = = = = = = = = = = = = = = :1/31 │
│ Rich-Lean Threshd V          ▲  │
│ Lean-Rich Threshd V             │
│ Low for Switch (V)           ?  │
│ High for Switch (V)             │
│ Rich-Lean Threshd S             │
│ Lean-Rich Threshd S          ▼  │
└──────────────────────────────────┘
```

**Figure 5.62**

5.    Use the **Up/Down** scroll button to view more
      screens of data if an ▼ or ▲ icon displays.

6.    Press the **ESC** button to return to the previous menu.

## 5.8 On-Board Monitor Test

The **On-Board Monitor Test** is useful after servicing or after erasing a vehicle's control module memory. The On-Board Monitor Test for non-CAN-equipped vehicles retrieves and displays test results for emission-related power train components and systems that are not continuously monitored.

1.  Use the **Up/Down** scroll button to select **On-Board Mon. Test** from **Diagnostic Menu** then press the **ENTER** button.
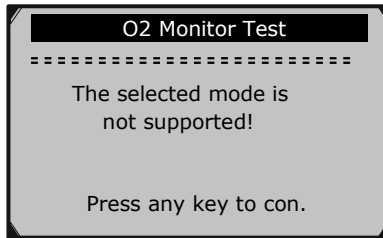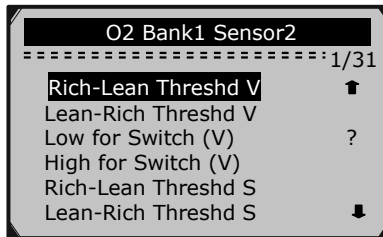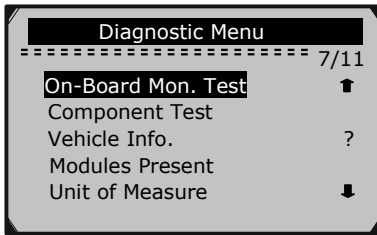
```
┌─────────────────────────────┐
│      Diagnostic Menu        │
│ ==================== 7/11   │
│  On-Board Mon. Test      ⬆  │
│  Component Test             │
│  Vehicle Info.           ?  │
│  Modules Present            │
│  Unit of Measure         ⬇  │
└─────────────────────────────┘
```

**Figure 5.63**

2.  Wait a few seconds while the Scan Tool validates the PID.

3.  From **On-Board Mon. Test** menu, use the **Up**/**Down** scroll button to select a test to view then press the **ENTER** button.

```
┌─────────────────────────────┐
│      On-Board Mon. Test     │
│ ===================:1/15    │
│  Test $01 Data           ⬆  │
│  Test $03 Data              │
│  Test $10 Data           ?  │
│  Test $21 Data              │
│  Test $22 Data              │
│  Test $25 Data           ⬇  │
└─────────────────────────────┘
```
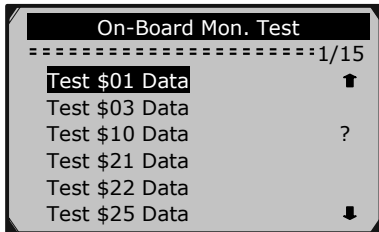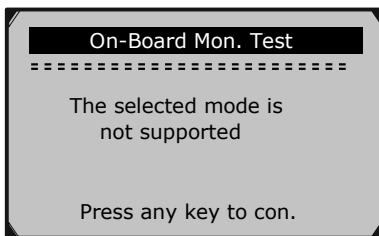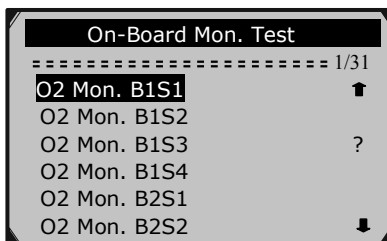
**Figure 5.64**

• If the vehicle under test does not support the mode, an advisory message will be displayed on the screen.

```
╭──────────────────────────────╮
│     On-Board Mon. Test       │
│ = = = = = = = = = = = = = = = = = = = = = = = │
│      The selected mode is    │
│        not supported         │
│                              │
│                              │
│      Press any key to con.   │
╰──────────────────────────────╯
```

**Figure 5.65**

• For CAN-equipped vehicles, test selections can be as below:

```
╭──────────────────────────────╮
│     On-Board Mon. Test       │
│ = = = = = = = = = = = = = = = = = = = = = 1/31 │
│  O2 Mon. B1S1            ⬆   │
│  O2 Mon. B1S2                │
│  O2 Mon. B1S3           ?    │
│  O2 Mon. B1S4                │
│  O2 Mon. B2S1                │
│  O2 Mon. B2S2            ⬇   │
╰──────────────────────────────╯
```
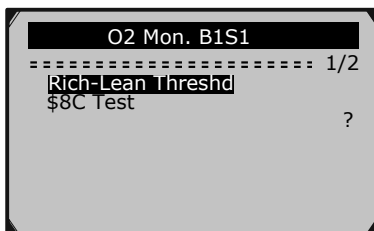
**Figure 5.66**

4. Use the **Up/Down** scroll button to select the desired monitor from **On-Board Mon. Test** menu then press the **ENTER** button.

5. View test data on screen.
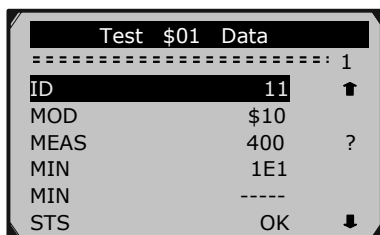
**Figure 5.67**

• For CAN-equipped vehicles, test selections can be as below
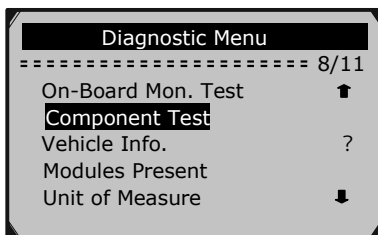


**Figure 5.68**

6.    Press **ESC** button to return to the previous menus.

## 5.9 Component Test

The **Component Test** function allows initiating a leak test for the vehicle's EVAP system. The Scan Tool itself does not perform the leak test, but commands the vehicle's on-board computer to start the test. Different vehicle manufacturers might have different criteria and methods for stopping the test once it has been started. Before starting the Component Test, refer to the vehicle's Owner's Manual for instructions to stop the test.

1.  Use the **Up**/**Down** scroll button to select **Component Test** from **Diagnostic Menu** then press the **ENTER** button.
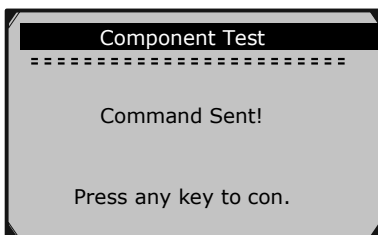
```
┌─────────────────────────────┐
│      Diagnostic Menu        │
│ ==================== 8/11    │
│    On-Board Mon. Test    ↑   │
│    Component Test            │
│    Vehicle Info.         ?   │
│    Modules Present          │
│    Unit of Measure       ↓   │
└─────────────────────────────┘
```

**Figure 5.69**

2.  Wait for the Scan Tool to display the **Component Test** menu.

```
┌─────────────────────────────┐
│      Component Test         │
│ =========================== │
│   Evap Leak Test            │
│                      ?      │
│                             │
│                             │
└─────────────────────────────┘
```
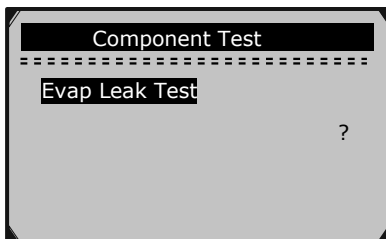
**Figure 5.70**

3.  If the test has been initiated by the vehicle, a confirmation message will be displayed on the screen.

```
┌─────────────────────────────┐
│      Component Test         │
│ ======================      │
│                             │
│       Command Sent!         │
│                             │
│                             │
│    Press any key to con.    │
└─────────────────────────────┘
```

**Figure 5.71**

• Some vehicles do not allow Scan Tools to control vehicle systems or components. If the vehicle under test does not support the EVAP Leak Test, an advisory message is displayed on the screen.

```
┌─────────────────────────────┐
│     Component Test          │
│ ======================      │
│      The selected mode is   │
│        not supported        │
│                             │
│     Press any key to con.   │
│                             │
└─────────────────────────────┘
```
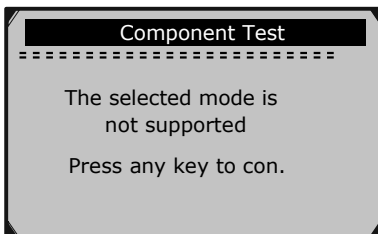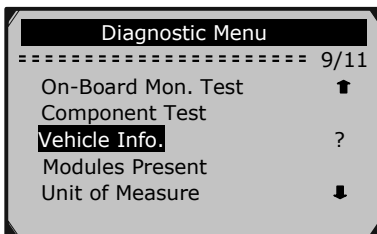
**Figure 5.72**

4.   Wait a few seconds or press any key to return to previous screen.
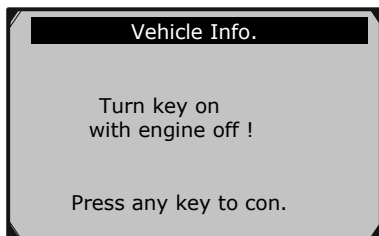
## 5.10 Viewing Vehicle Information

**The Vehicle Info.** function enables retrieval of Vehicle ID, Calibration ID, Calibration Verification and In-use Performance Tracking on 2000 and newer vehicles that support Mode 9.

1.   Use **Up/Down** scroll button to select **Vehicle Info.** from the **Diagnostic Menu** and press **ENTER** button.

```
┌─────────────────────────────┐
│      Diagnostic Menu        │
│ ===================== 9/11  │
│   On-Board Mon. Test    ⬆   │
│   Component Test            │
│   Vehicle Info.         ?   │
│   Modules Present           │
│   Unit of Measure       ⬇   │
└─────────────────────────────┘
```

**Figure 5.73**

2.    An advisory message comes up to remind you. Wait
      a few seconds or press any key to continue.

```
┌──────────────────────────────┐
│      Vehicle Info.           │
│                              │
│        Turn key on           │
│       with engine off !      │
│                              │
│      Press any key to con.   │
└──────────────────────────────┘
```

**Figure 5.74**

3.    Wait a few seconds while the Scan Tool
      reads vehicle information.

```
┌──────────────────────────────┐
│      Vehicle Info.           │
│ ==================== │
│        Reading info…         │
│       - Please Wait -        │
│                              │
│                              │
└──────────────────────────────┘
```
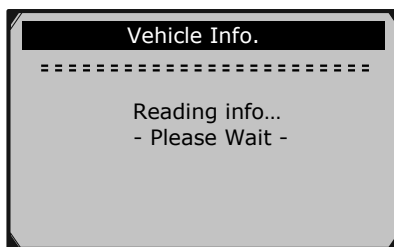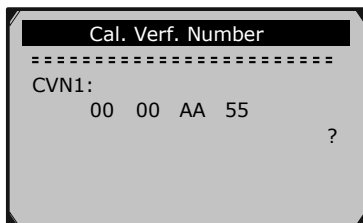
**Figure 5.75**

• If the vehicle does not support this mode, a message shows
on the display warning that the mode is not supported.

4.  From **Vehicle Info.** Menu, use the **Up/Down** scroll button to select an available item to view then press the **ENTER** button.

```
┌─────────────────────────────┐
│      Vehicle Info.          │
│ =====================2/2    │
│ Calibration ID             │
│ Cal. Verf. Number          │
│                         ?  │
│                             │
│                             │
└─────────────────────────────┘
```
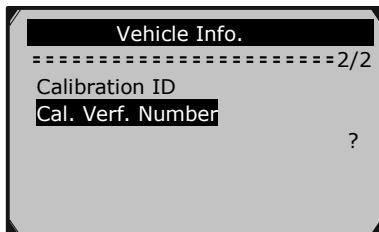
**Figure 5.76**

5.  View retrieved vehicle information on screen.

```
┌─────────────────────────────┐
│     Cal. Verf. Number       │
│ =====================       │
│ CVN1:                       │
│     00  00  AA  55         │
│                         ?  │
│                             │
│                             │
└─────────────────────────────┘
```
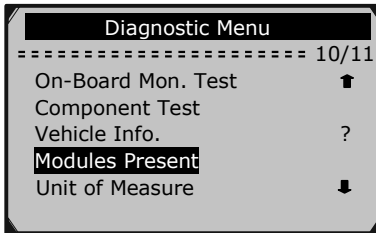
**Figure 5.77**

6.  Press the **ESC** button to return to previous menu.
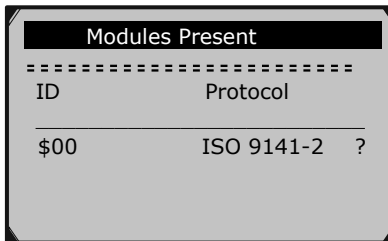
## 5.10 Modules Present

The **Modules Present** function allows viewing of the module IDs and communication protocols for OBD II modules in the vehicle.

1.  Use the **Up/Down** scroll button to select **Modules Present** from **Diagnostic Menu** and press **ENTER** button.

```
┌─────────────────────────────────┐
│        Diagnostic Menu          │
│ ==================== 10/11      │
│   On-Board Mon. Test        ⬆   │
│   Component Test                │
│   Vehicle Info.             ?   │
│   Modules Present               │
│   Unit of Measure           ⬇   │
└─────────────────────────────────┘
```
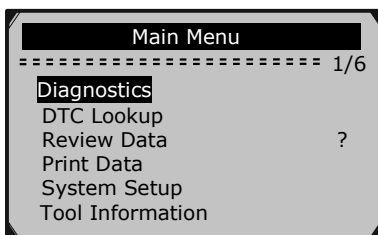
**Figure 5.78**

2.  View **Modules Present** with their IDs and communication protocols.

```
┌─────────────────────────────────┐
│        Modules Present          │
│ =========================       │
│   ID            Protocol        │
│ ─────────────────────────────── │
│   $00          ISO 9141-2   ?   │
│                                 │
└─────────────────────────────────┘
```

**Figure 5.79**

# 6. ABS Testing

1.   Turn the ignition off.

2.   Locate the vehicle's DLC.

3.   Plug the Scan Tool's OBD II connector to the vehicle's DLC.

4.   Turn the ignition on. Engine can be off or running.

5.   Press the **ENTER** button to enter **Main Menu**. Use the
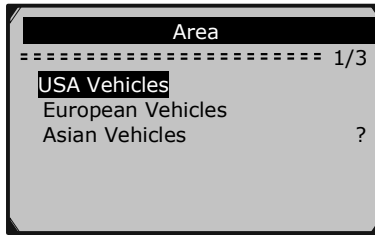     **Up/ Down** scroll button to select **Diagnostics** from the menu.

```
        Main Menu
===================== 1/6
  Diagnostics
  DTC Lookup
  Review Data              ?
  Print Data
  System Setup
  Tool Information
```

**Figure 6.1**

• Press the **ENTER** button and wait for
the **Diagnostics** menu to appear.

```
       Diagnostics
===================== 2/2
  OBD2&EOBD
  ABS
                           ?
```
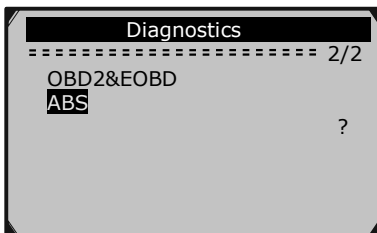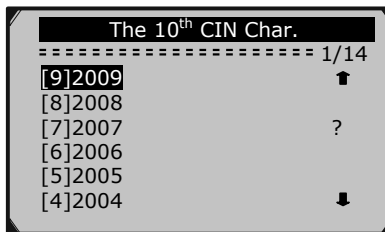
**Figure 6.2**

• Select ABS and wait for the Area menu to appear.
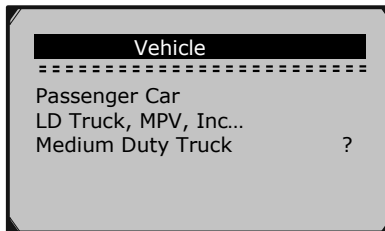
**Figure 6.3**

Example: To run ABS test on GM:

1.    Select ABS and wait for the Vehicle Menu to appear.
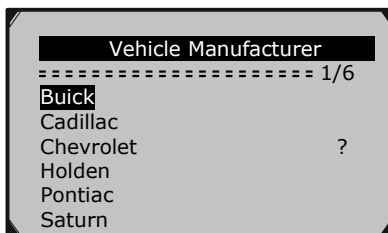
2.    Select GM and choose the correct Model Year.

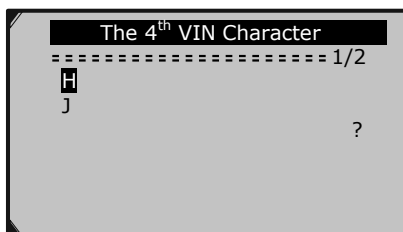

**Figure 6.4**

3.    Select your vehicle type.



**Figure 6.5**

4.    Choose your vehicle manufacture.

```
┌─────────────────────────────┐
│     Vehicle Manufacturer     │
│ ==================== 1/6     │
│ Buick                        │
│ Cadillac                     │
│ Chevrolet               ?    │
│ Holden                       │
│ Pontiac                      │
│ Saturn                       │
└─────────────────────────────┘
```

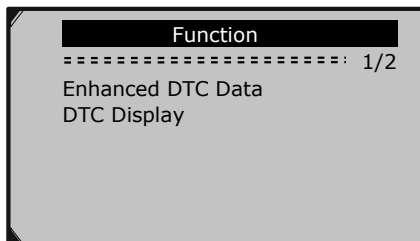**Figure 6.6**

5.    Choose the correct series No. of your vehicle;
      wait for the System Menu to appear. (Please
      refer to the 4th VIN character for a passenger
      car, and the 5th VIN character for a truck.)

```
┌─────────────────────────────┐
│     The 4th VIN Character     │
│ ==================== 1/2     │
│ H                            │
│ J                            │
│                         ?    │
│                              │
│                              │
└─────────────────────────────┘
```

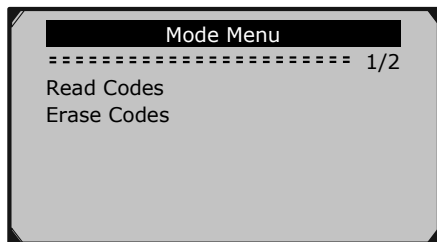**Figure 6.7**

**Note:** You may not need to make all the selections, or have to
        select other features. For some vehicles, the tool will not ask
        for any information before turning to the Function menu.

6.    Wait for the Function menu.

```
┌─────────────────────────────┐
│         Function            │
│ ====================: 1/2    │
│ Enhanced DTC Data           │
│ DTC Display                 │
│                             │
│                             │
└─────────────────────────────┘
```

**Figure 6.8**

• Click on "Enhanced DTC Data" to read
enhanced code information.

• Click on "DTC Display" and wait for the following screen.

```
┌─────────────────────────────┐
│         Mode Menu           │
│ ======================= 1/2 │
│ Read Codes                  │
│ Erase Codes                 │
│                             │
│                             │
└─────────────────────────────┘
```

**Figure 6.9**

• Click on "Read Codes" to read code information.

• Click on "Erase Codes" to delete code information.

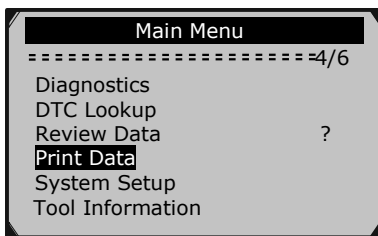# 7. Print Data

The Print Data function allows the printing of diagnostic data recorded by the Scan Tool or customized test reports.

**To print out retrieved data, you need the following tools***:*
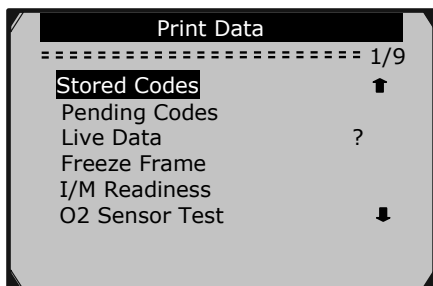
Cen-Tech 60794 Scan Tool
A computer with a USB port
Supplied USB cable

1.  Install software applications through the included CD, or download the applications from our website: www.HarborFreight.com.

2.  Connect the Scan Tool to the computer with the supplied USB cable.

3.  Run the software.

4.  Use the **Up**/**Down** scroll button to select **Print Data** from **Main Menu**, then press the **ENTER** button.
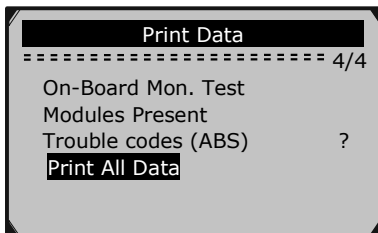
```
┌──────────────────────────┐
│        Main Menu         │
│ = = = = = = = = = = = =4/6│
│  Diagnostics             │
│  DTC Lookup              │
│  Review Data          ?  │
│  Print Data              │
│  System Setup            │
│  Tool Information        │
└──────────────────────────┘
```

**Figure 7.1**

5.  Use the **Up**/**Down** scroll button to select the desired item to print from **Print Data** menu.

```
┌─────────────────────────────┐
│         Print Data          │
│ ==================== 1/9    │
│ [Stored Codes]          ↑   │
│  Pending Codes              │
│  Live Data              ?   │
│  Freeze Frame               │
│  I/M Readiness              │
│  O2 Sensor Test         ↓   │
└─────────────────────────────┘
```

**Figure 7.2**

• To print all retrieved data, use the **Up**/**Down** scroll button to select **Print All Data** from **Print Data** menu.

```
┌─────────────────────────────┐
│         Print Data          │
│ ==================== 4/4    │
│  On-Board Mon. Test         │
│  Modules Present            │
│  Trouble codes (ABS)    ?   │
│ [Print All Data]            │
└─────────────────────────────┘
```

**Figure 7.3**

6.  Press the **ENTER** button to upload data to the computer.

7.  Click the [ ] button to print the data.

***NOTE: Data stored in a language different from current system settings of the Scan Tool will not be printable. Please adjust language settings before printing. A reminder would pop up under such circumstances.***

# 8. Appendix

## 8.1 Appendix 1 -- PID List

| PID Abbreviation | Full Name |
|---|---|
| DTC_CNT | DTC Stored Number |
| DTCFRZF | DTC |
| FUELSYS1 | Fuel System 1 Status |
| FUELSYS2 | Fuel System 2 Status |
| LOAD_PCT (%) | Calculated Load Value |
| ETC(°F) | Engine Coolant Temperature |
| ETC(°C) | Engine Coolant Temperature |
| SHRTFT1 (%) | Short Term Fuel Trim-Bank1 |
| SHRTFT3 (%) | Short Term Fuel Trim-Bank3 |
| LONGFT1 (%) | Long Term Fuel Trim-Bank1 |
| LONGFT3 (%) | Long Term Fuel Trim-Bank3 |
| SHRTFT2 (%) | Short Term Fuel Trim-Bank2 |
| SHRTFT4 (%) | Short Term Fuel Trim-Bank4 |
| LONGFT2 (%) | Long Term Fuel Trim-Bank2 |
| LONGFT4 (%) | Long Term Fuel Trim-Bank4 |
| FRP(kPa) | Fuel Rail Pressure(gauge) |
| FRP(psi) | Fuel Rail Pressure(gauge) |

| | |
|---|---|
| MAP(kPa) | Intake Manifold Absolute Pressure |
| MAP(inHg) | Intake Manifold Absolute Pressure |
| RPM(/min) | Engine RPM |
| VSS(km/h) | Vehicle Speed Sensor |
| VSS(mph) | Vehicle Speed Sensor |
| SPARKADV(\x82) | Ignition Timing Advance for #1 |
| IAT(°F) | Intake Air Temperature |
| IAT(°C) | Intake Air Temperature |
| MAF(g/s) | Mass Air Flow Sensor |
| MAF(lb/min) | Mass Air Flow Sensor |
| TP (%) | Absolute Throttle Position |

| PID Abbreviation | Full Name |
|---|---|
| AIR_STAT | Commanded Secondary Air Status |
| O2SLOC | Location of O2 Sensors |
| O2B1S1(V) | O2 Sensor Output Voltage(B1S1) |
| SHRTFTB1S1 (%) | Short Term Fuel Trim(B1S1) |
| O2B1S2(V) | O2 Sensor Output Voltage(B1S2) |
| SHRTFTB1S2 (%) | Short Term Fuel Trim(B1S2) |
| O2B1S3(V) | O2 Sensor Output Voltage(B1S3) |
| SHRTFTB1S3 (%) | Short Term Fuel Trim(B1S3) |
| O2B1S4(V) | O2 Sensor Output Voltage(B1S4) |
| SHRTFTB1S4 (%) | Short Term Fuel Trim(B1S4) |
| O2B2S1(V) | O2 Sensor Output Voltage(B2S1) |
| SHRTFTB2S1 (%) | Short Term Fuel Trim(B2S1) |
| O2B2S2(V) | O2 Sensor Output Voltage(B2S2) |
| SHRTFTB2S2 (%) | Short Term Fuel Trim(B2S2) |
| O2B2S3(V) | O2 Sensor Output Voltage(B2S3) |
| SHRTFTB2S3 (%) | Short Term Fuel Trim(B2S3) |
| O2B2S4(V) | O2 Sensor Output Voltage(B2S4) |
| SHRTFTB2S4 (%) | Short Term Fuel Trim(B2S4) |
| O2B1S1(V) | O2 Sensor Output Voltage(B2S1) |
| SHRTFTB1S1 (%) | Short Term Fuel Trim(B2S1) |
| O2B1S2(V) | O2 Sensor Output Voltage(B1S2) |
| SHRTFTB1S2 (%) | Short Term Fuel Trim(B1S2) |
| O2B2S1(V) | O2 Sensor Output Voltage(B2S1) |
| SHRTFTB2S1 (%) | Short Term Fuel Trim(B2S1) |
| O2B2S2(V) | O2 Sensor Output Voltage(B2S2) |
| SHRTFTB2S2 (%) | Short Term Fuel Trim(B2S2) |
| O2B3S1(V) | O2 Sensor Output Voltage(B3S1) |
| SHRTFTB3S1 (%) | Short Term Fuel Trim(B3S1) |
| O2B3S2(V) | O2 Sensor Output Voltage(B3S2) |
| SHRTFTB3S2 (%) | Short Term Fuel Trim(B3S2) |
| O2B4S1(V) | O2 Sensor Output Voltage(B4S1) |

| PID Abbreviation | Full Name |
|---|---|
| SHRTFTB4S1 (%) | Short Term Fuel Trim(B4S1) |
| O2B4S2(V) | O2 Sensor Output Voltage(B4S2) |
| SHRTFTB4S2 (%) | Short Term Fuel Trim(B4S2) |
| OBDSUP | OBD Require To Which Vehicle Designed |
| O2SLOC | Location of O2 Sensors |
| RUNTM(sec) | Time Since Engine Start |
| MIL_DIST(km) | Distance Travelled While MIL Activated |
| MIL_DIST(mile) | Distance Travelled While MIL Activated |
| FRP(kPa) | FuelRail Pres. Relative To Manifold Vacuum |
| FRP(PSI) | FuelRail Pres. Relative To Manifold Vacuum |
| FRP(kPa) | Fuel Rail Pressure |
| FRP(PSI) | Fuel Rail Pressure |
| EQ_RATB1S1 | Equivalence Ratio(wide range O2S)(B1S1) |
| O2B1S1(V) | O2 Sensor Voltage(wide range O2S)(B1S1) |
| EQ_RATB1S2 | Equivalence Ratio(wide range O2S)(B1S2) |
| O2B1S2(V) | O2 Sensor Voltage(wide range O2S)(B1S2) |
| EQ_RATB1S3 | Equivalence Ratio(wide range O2S)(B1S3) |
| O2B1S3(V) | O2 Sensor Voltage(wide range O2S)(B1S3) |
| EQ_RATB1S4 | Equivalence Ratio(wide range O2S)(B1S4) |
| O2B1S4(V) | O2 Sensor Voltage(wide range O2S)(B1S4) |
| EQ_RATB2S1 | Equivalence Ratio(wide range O2S)(B2S1) |
| O2B2S1(V) | O2 Sensor Voltage(wide range O2S)(B2S1) |
| EQ_RATB2S2 | Equivalence Ratio(wide range O2S)(B2S2) |
| O2B2S2(V) | O2 Sensor Voltage(wide range O2S)(B2S2) |
| EQ_RATB2S3 | Equivalence Ratio(wide range O2S)(B2S3) |
| O2B2S3(V) | O2 Sensor Voltage(wide range O2S)(B2S3) |
| EQ_RATB2S4 | Equivalence Ratio(wide range O2S)(B2S4) |
| O2B2S4(V) | O2 Sensor Voltage(wide range O2S)(B2S4) |
| EQ_RATB1S1 | Equivalence Ratio(wide range O2S)(B2S1) |
| O2B1S1(V) | O2 Sensor Voltage(wide range O2S)(B2S1) |
| EQ_RATB1S2 | Equivalence Ratio(wide range O2S)(B1S2) |
| O2B1S2(V) | O2 Sensor Voltage(wide range O2S)(B1S2) |

| PID Abbreviation | Full Name |
|---|---|
| EQ_RATB2S1 | Equivalence Ratio(wide range O2S)(B2S1) |
| O2B2S1(V) | O2 Sensor Voltage(wide range O2S)(B2S1) |
| EQ_RATB2S2 | Equivalence Ratio(wide range O2S)(B2S2) |
| O2B2S2(V) | O2 Sensor Voltage(wide range O2S)(B2S2) |
| EQ_RATB3S1 | Equivalence Ratio(wide range O2S)(B3S1) |
| O2B3S1(V) | O2 Sensor Voltage(wide range O2S)(B3S1) |
| EQ_RATB3S2 | Equivalence Ratio(wide range O2S)(B3S2) |
| O2B3S2(V) | O2 Sensor Voltage(wide range O2S)(B3S2) |
| EQ_RATB4S1 | Equivalence Ratio(wide range O2S)(B4S1) |
| O2B4S1(V) | O2 Sensor Voltage(wide range O2S)(B4S1) |
| EQ_RATB4S2 | Equivalence Ratio(wide range O2S)(B4S2) |
| O2B4S2(V) | O2 Sensor Voltage(wide range O2S)(B4S2) |
| EGR_PTC (%) | Commanded EGR |
| EGR_ERR (%) | EGR Error |
| EVAP_PCT (%) | Commanded Evaporative Purge |
| FLI (%) | Fuel Level Input |
| WARM_UPS | Number of Warm-ups Since DTC Cleared |
| CLR_DIST(km) | Distance Since DTC Cleared |
| CLR_DIST(mile) | Distance Since DTC Cleared |
| EVAP_VP(Pa) | Evap System Vapor Pressure |
| EVAP_VP(inH2O) | Evap System Vapor Pressure |
| BARO(kPa) | Barometric Pressure |
| BARO(inHg) | Barometric Pressure |
| EQ_RAT11 | Equivalence Ratio(wide range O2S)(B1S1) |
| O2S11(mA) | O2 Sensor Current(wide range O2S)(B1S1) |
| EQ_RAT12 | Equivalence Ratio(wide range O2S)(B1S2) |
| O2S12(mA) | O2 Sensor Current(wide range O2S)(B1S2) |
| EQ_RAT13 | Equivalence Ratio(wide range O2S)(B1S3) |
| O2S13(mA) | O2 Sensor Current(wide range O2S)(B1S3) |
| EQ_RAT14 | Equivalence Ratio(wide range O2S)(B1S4) |
| O2S14(mA) | O2 Sensor Current(wide range O2S)(B1S4) |
| EQ_RAT21 | Equivalence Ratio(wide range O2S)(B2S1) |

| PID Abbreviation | Full Name |
|---|---|
| O2S21(mA) | O2 Sensor Current(wide range O2S)(B2S1) |
| EQ_RAT22 | Equivalence Ratio(wide range O2S)(B2S2) |
| O2S22(mA) | O2 Sensor Current(wide range O2S)(B2S2) |
| EQ_RAT23 | Equivalence Ratio(wide range O2S)(B2S3) |
| O2S23(mA) | O2 Sensor Current(wide range O2S)(B2S3) |
| EQ_RAT24 | Equivalence Ratio(wide range O2S)(B2S4) |
| O2S24(mA) | O2 Sensor Current(wide range O2S)(B2S4) |
| EQ_RAT11 | Equivalence Ratio(wide range O2S)(B2S1) |
| O2S11(mA) | O2 Sensor Current(wide range O2S)(B2S1) |
| EQ_RAT12 | Equivalence Ratio(wide range O2S)(B1S2) |
| O2S12(mA) | O2 Sensor Current(wide range O2S)(B1S2) |
| EQ_RAT21 | Equivalence Ratio(wide range O2S)(B2S1) |
| O2S21(mA) | O2 Sensor Current(wide range O2S)(B2S1) |
| EQ_RAT22 | Equivalence Ratio(wide range O2S)(B2S2) |
| O2S22(mA) | O2 Sensor Current(wide range O2S)(B2S2) |
| EQ_RAT31 | Equivalence Ratio(wide range O2S)(B3S1) |
| O2S31(mA) | O2 Sensor Current(wide range O2S)(B3S1) |
| EQ_RAT32 | Equivalence Ratio(wide range O2S)(B3S2) |
| O2S32(mA) | O2 Sensor Current(wide range O2S)(B3S2) |
| EQ_RAT41 | Equivalence Ratio(wide range O2S)(B4S1) |
| O2S41(mA) | O2 Sensor Current(wide range O2S)(B4S1) |
| EQ_RAT42 | Equivalence Ratio(wide range O2S)(B4S2) |
| O2S42(mA) | O2 Sensor Current(wide range O2S)(B4S2) |
| CATEMP11(°F) | Catalyst Temperature Bank1Sensor1 |
| CATEMP11(°C) | Catalyst Temperature Bank1Sensor1 |
| CATEMP21(°F) | Catalyst Temperature Bank2Sensor1 |
| CATEMP21(°C) | Catalyst Temperature Bank2Sensor1 |
| CATEMP12(°F) | Catalyst Temperature Bank1Sensor2 |
| CATEMP12(°C) | Catalyst Temperature Bank1Sensor2 |
| CATEMP22(°F) | Catalyst Temperature Bank2Sensor2 |
| CATEMP22(°C) | Catalyst Temperature Bank2Sensor2 |
| VPWR(V) | Control Module Voltage |

| PID Abbreviation | Full Name |
| --- | --- |
| LOAD_ABS (%) | Absolute Load Value |
| EQ_RAT | Commanded Equivalence Ratio |
| TP_R (%) | Relative Throttle Position |
| AAT(°F) | Ambient Air Temperature |
| AAT(°C) | Ambient Air Temperature |
| TP_B (%) | Absolute Throttle Position B |
| TP_C (%) | Absolute Throttle Position C |
| APP_D (%) | Accelerator Pedal Position D |
| APP_E (%) | Accelerator Pedal Position E |
| APP_F (%) | Accelerator Pedal Position F |
| TAC_PCT (%) | Commanded Throttle Actuator Control |
| MIL_TIME | Minute run by Engine While MIL activated |
| CLR_TIME | Time since Diagnostic Trouble Code Clear |

## 8.2 Appendix 2 -- In-Use Performance Tracking Data List

| Abbreviation | Full Name | Definitions |
|---|---|---|
| OBDCOND | **OBD Monitoring Conditions Encountered Counts** | OBD Monitoring Conditions Encountered Counts displays number of times that the vehicle has been operated in the specified OBD monitoring conditions (general denominator). |
| IGNCNTR | **Ignition Counter** | Ignition Counter displays the count of number of times that the engine has been started. |
| CATCOMP1 | **Catalyst Monitor Completion Counts Bank 1** | Catalyst Monitor Completion Counts Bank 1 displays number of times that all conditions necessary to detect a catalyst system bank 1 malfunction have been encountered (numerator). |
| CATCOND1 | **Catalyst Monitor Conditions Encountered Counts Bank 1** | Catalyst Monitor Conditions Encountered Counts Bank 1 displays number of times that the vehicle has been operated in the specified catalyst monitoring conditions (denominator). |
| CATCOMP2 | **Catalyst Monitor Completion Counts Bank 2** | Catalyst Monitor Completion Counts Bank 2 displays number of time that all conditions necessary to detect a catalyst system bank 2 malfunction have been encountered (numerator). |
| CATCOND2 | **Catalyst Monitor Conditions Encountered Counts Bank 2** | Catalyst Monitor Conditions Encountered Counts Bank 2 displays number of times that the vehicle has been operated in the specified catalyst monitoring conditions (denominator). |

| | | |
|---|---|---|
| O2SCOMP1 | **O2 Sensor Monitor Completion Counts Bank 1** | O2 Sensor Monitor Completion Counts Bank 1 displays number of time that all conditions necessary to detect an oxygen sensor bank 1 malfunction have been encountered (numerator). |
| O2SCOND1 | **O2 Sensor Monitor Conditions Encountered Counts Bank 1** | O2 Sensor Monitor Conditions Encountered Counts Bank 1 displays number of times that the vehicle has been operated in the specified oxygen sensor monitoring conditions (denominator). |
| O2SCOMP2 | **O2 Sensor Monitor Completion Counts Bank 2** | O2 Sensor Monitor Completion Counts Bank 2 displays number of time that all conditions necessary to detect an oxygen sensor bank 2 malfunction have been encountered (numerator). |
| O2SCOND2 | **O2 Sensor Monitor Conditions Encountered Counts Bank 2** | O2 Sensor Monitor Conditions Encountered Counts Bank 2 displays number of times that the vehicle has been operated in the specified oxygen sensor monitoring conditions (denominator). |
| EGRCOMP | **EGR Monitor Completion Condition Counts** | EGR Monitor Completion Condition Counts displays number of time that all conditions necessary to detect an EGR system malfunction have been encountered (numerator). |
| EGRCOND | **EGR Monitor Conditions Encountered Counts** | EGR Monitor Conditions Encountered Counts displays number of times that the vehicle has been operated in the specified EGR system monitoring conditions (denominator). |

| AIRCOMP | **AIR Monitor Completion Condition Counts (Secondary Air)** | AIR Monitor Completion Condition Counts (Secondary Air) displays number of time that all conditions necessary to detect an AIR system malfunction have been encountered (numerator). |
|---------|---------|---------|
| AIRCOND | **AIR Monitor Conditions Encountered Counts (Secondary Air)** | AIR Monitor Conditions Encountered Counts (Secondary Air) displays number of times that the vehicle has been operated in the specified AIR system monitoring conditions (denominator). |
| EVAPCOMP | **EVAP Monitor Completion Condition Counts** | EVAP Monitor Completion Condition Counts displays number of time that all conditions necessary to detect a 0.020" EVAP system leak malfunction have been encountered (numerator). |
| EVAPCOND | **EVAP Monitor Conditions Encountered Counts** | EVAP Monitor Conditions Encountered Counts displays number of times that the vehicle has been operated in the specified EVAP system leak malfunction monitoring conditions (denominator). |

# 9. Limited 90 Day Warranty

Harbor Freight Tools Co. makes every effort to assure that its products meet high quality and durability standards, and warrants to the original purchaser that this product is free from defects in materials and workmanship for the period of 90 days from the date of purchase. This warranty does not apply to damage due directly or indirectly, to misuse, abuse, negligence or accidents, repairs or alterations outside our facilities, criminal activity, improper installation, normal wear and tear, or to lack of maintenance. We shall in no event be liable for death, injuries to persons or property, or for incidental, contingent, special or consequential damages arising from the use of our product. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation of exclusion may not apply to you. THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS.

To take advantage of this warranty, the product or part must be returned to us with transportation charges prepaid. Proof of purchase date and an explanation of the complaint must accompany the merchandise. If our inspection verifies the defect, we will either repair or replace the product at our election or we may elect to refund the purchase price if we cannot readily and quickly provide you with a replacement. We will return repaired products at our expense, but if we determine there is no defect, or that the defect resulted from causes not within the scope of our warranty, then you must bear the cost of returning the product. This warranty gives you specific legal rights and you may also have other rights which vary from state to state.